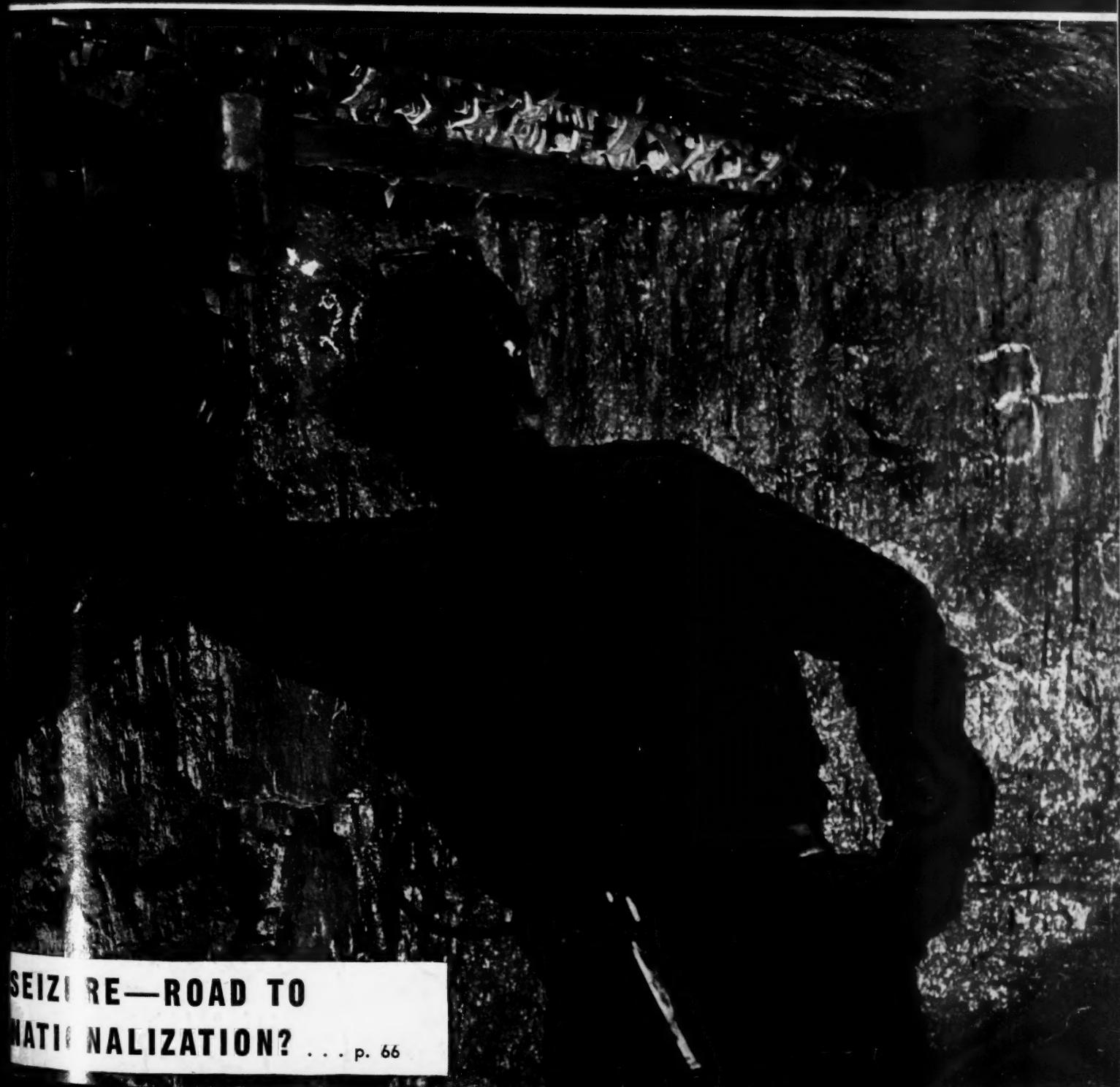


Power Voltage

August, 1946



SEIZURE—ROAD TO
NATIONALIZATION? . . . p. 66



Saves \$5.33 A DAY... Increases TONNAGE

SUN MINE LUBRICANT...

Resists Washing of Mine Water, Ends Constant Need for Loader Maintenance

A big Pennsylvania mine was having trouble because the grease used in loading machines was constantly being washed out. Every two or three days, good machines and good men had to stand idle while the loaders were greased.

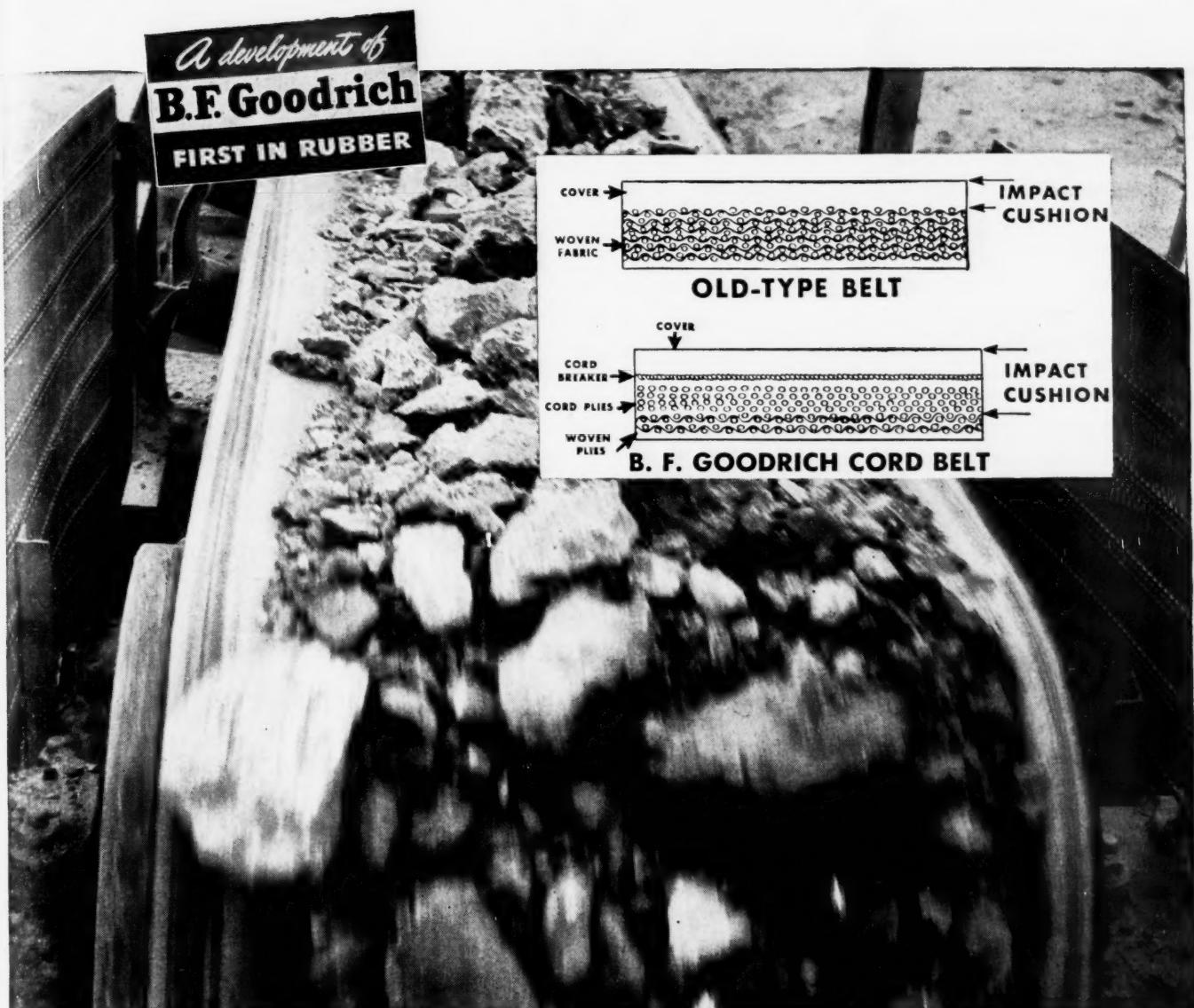
A Sun Engineer made a careful check of the conditions, and then recommended a "Job-Proved" Sun grease—one used in dozens of applications where similar conditions prevailed.

This grease stayed on the job six times as long as the former product. Greasing is now necessary only every two or three weeks. An appreciable cash saving in maintenance time and grease costs has been realized.

Most important of all, machines and men now work more continuously, and production has risen. This case is typical of the way "Job-Proved" Sun lubricants help boost production and cut costs. Call the Sun man near you for complete facts.

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News-Voice of the Air—Lowell Thomas

SUN
SUNOCO
INDUSTRIAL
PRODUCTS



B. F. Goodrich cord conveyor belt reduces handling costs, lowers maintenance expense, gives long life with minimum upkeep

Developed for heavy-duty materials handling service

MANY B. F. Goodrich cord conveyor belts have carried 6, 7, 10 million tons of material without appreciable signs of wear. One mine operator in Minnesota reports savings of \$30,000 per year by the elimination of transfer points, plus saving all the time and cost formerly wasted in shutdowns and repairs. The cord belt's long life and superior performance result from shock absorbing action that is built into the carcass of the belt.

In this new construction, each cord in each ply is completely surrounded

by rubber. Then a layer of parallel cords called a transverse breaker, also embedded in rubber, is laid across the belt—floating in rubber above the carcass and covered at the surface by another rubber layer.

Because each cord is embedded in rubber, the impact cushion, as shown in the diagram, is nearly 3 times thicker than in conventional belt construction—impact resistance is nine times as great. The transverse cord breaker absorbs the impact over a

greater area and increases adhesion of cover to carcass by at least 50%.

Your service requirements may not call for a heavy duty belt like the cord belt. So remember that there is a B. F. Goodrich belt for *every* kind of service. Be sure to specify B. F. Goodrich. Call your B. F. Goodrich distributor for *all* conveyor belt needs. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich
RUBBER and SYNTHETIC products

First in its Field....



JOHN A. ROEBLING



Illustrations courtesy John A. Roebling's Sons Company, Trenton 2, N. J., from the book, "The Roebling Story."

The World's First Successful Railway Suspension Bridge

On March 16, 1855, for the first time in history, a train rumbled across a bridge suspended from wire cables! This was the famous International Railway Suspension Bridge, gravely pronounced "impracticable" by the experts . . . built over Niagara Gorge, above the Whirlpool Rapids, by John A. Roebling, who introduced to America the first rope fabricated out of wire, and founder of the Company whose name is synonymous with famous suspension bridges the world over.

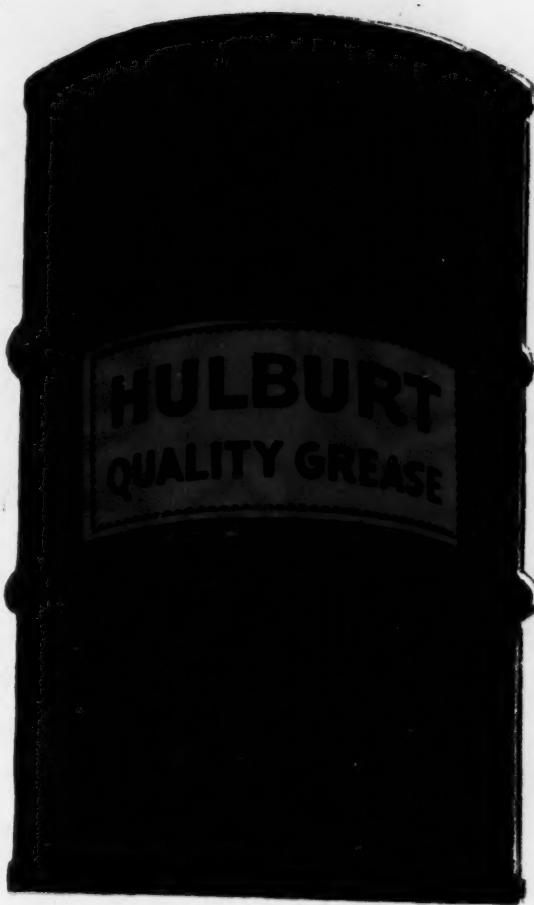
Over a quarter-century ago, for the first time in coal mining history, a Grease was produced perfect for one specific purpose—HULBURT QUALITY GREASE for lubricating Coal Mining machinery. Pronounced then by experienced operators as exactly suited to this work, the name HULBURT QUALITY GREASE has become synonymous with (1) perfect lubrication of coal mining machinery, and (2) HULBURT down-in-the-mine ENGINEERING SERVICE that further helps to assure perfect results under all conditions.

HULBURT OIL & GREASE COMPANY — PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

... a record of

American Leadership

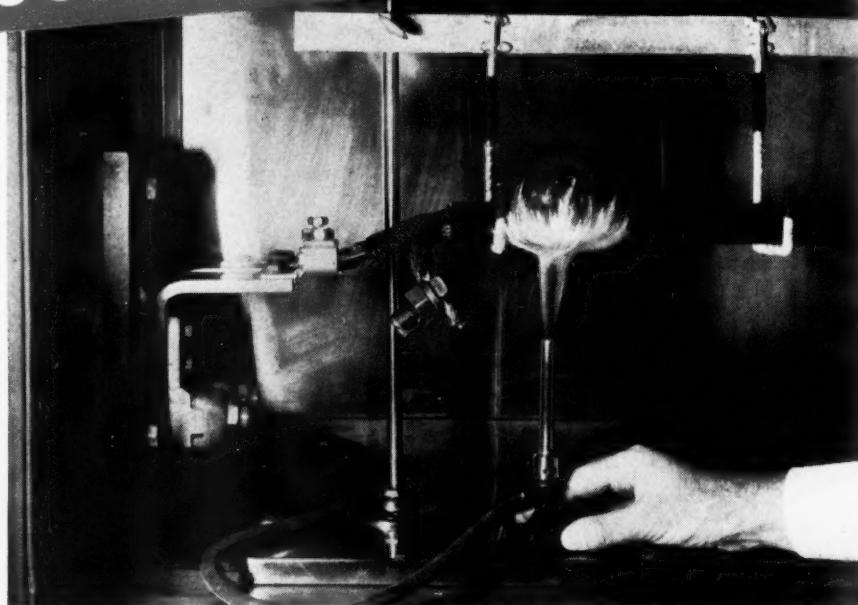


HULBURT

Quality **G**REASE

THE "FIRST NAME" IN

SELECT HAZARD PORTABLE CABLES for protection against fire



• Hazaprene Cables meet this new flame-resistance test of Penna. Dept. of Mines which includes application of flame for one minute after the cable has been overloaded 400% and sheath temperature has reached 350 degrees F.



• Hazaprene Flame-Resistant Twin-Parallel Mining Machine Cable. Penna. Dept. of Mines Approval P-104.

Meeting the new rigid requirements for fire-resistant trailing cables established by the Penna. Dept. of Mines is no problem at Hazard. For several years, all Hazard trailing cables have been built with a Hazaprene jacket made with neoprene to give them high flame-resistance as well as other important qualities. This Hazard jacket fully meets the new requirements of Pennsylvania and now carries the official approval symbol P-104.

And with Hazaprene cable, you can also count on getting all the other life-extending properties you want with trailing cables. You get a tough jacket that's pressure-cured in a continuous metal mold for maximum density, extra surface smoothness, good all-around resistance to mechanical damage. You get a sheath resistant to oil, acids, chemicals, grease and water. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

insulated wires and cables for every mining use

4690

Coal Age

Alfred M. Staehle, Publisher

IVAN A. GIVEN, Editor

R. Dawson Hall J. H. Edwards
R. R. Richart W. A. Stanbury, Jr.

W. H. McNeal

H. Roan, Art Director

F. A. Zimmerli, Associate

Donald D. Hogate, Washington

H. R. Mathias, Sales Manager

World News offices: London, Paris,
Berlin, Moscow, Prague, Shanghai,
Bombay, Mexico City.



COAL AGE (with which is consolidated
"The Colliery Engineer" and "Mines and Minerals") is published monthly
on the 1st. Allow at least ten days for
change of address.

Subscription rates: United States
and possessions, \$3 for one year, \$4
for two years, \$5 for three years.
Canada, \$4 for one year, \$6 for two
years, \$8 for three years. Pan American
countries, \$6 for one year, \$10 for
two years, \$12 for three years. All
other countries, \$15 for one year, \$30
for three years. Single copies, 35 cents
each. Entered as second class matter
Oct. 14, 1936, at the Post Office at
Albany, N. Y., under the Act of March
3, 1879. Printed in the U. S. A. Cable
Address: "McGraw-Hill N. Y." Member
A.B.P. Member A.B.C. Please
indicate position and company con-
nection on all subscription orders.

Return Postage Guaranteed

Contents Copyright 1946 by
McGraw-Hill Publishing Co., Inc.;
all rights reserved

JAMES H. McGRAW
Founder and Honorary Chairman

JAMES H. McGRAW, JR.
President

CURTIS W. McGRAW
Senior Vice President and Treasurer

JOSEPH A. GERARDI
Secretary

NELSON BOND
Director of Advertising

EUGENE DUFFIELD
Editorial Assistant to the President

J. E. BLACKBURN, JR.
Director of Circulation

Publication office, 99-129 North Broadway, Albany 1, N. Y. Editorial and executive offices, 330 W. 42d St., New York 18, N. Y. Branch offices: 520 North Michigan Ave., Chicago 11; 68 Post St., San Francisco, 4; Aldwych House, Aldwych, London, W.C. 2; Washington, 4; Philadelphia, 2; Cleveland, 15; Detroit, 26; St. Louis, 1; Boston, 16; Atlanta, 3; Los Angeles, 14; 738-9 Oliver Bldg., Pittsburgh, 22.

All communications about subscriptions
should be addressed to the Director of
Circulation, Coal Age, 99-129 North
Broadway, Albany 1, N. Y., or 330
West 42d St., New York 18, N. Y.

District Managers: T. E. Alcorn and
F. W. Roets, New York; W. A. Potter,
Philadelphia; W. M. Spears, Cleve-
land; W. S. Drake, Pittsburgh; S. J.
Alling, Chicago; C. J. Coash, St. Louis.

CONTENTS

Volume 51

AUGUST, 1946

Number 8

Seizure: Road to Nationalization?..... 66
By IVAN A. GIVEN and W. A. STANBURY, JR.

Loaders and Duckbills Meet Conditions at Blue Pennant..... 72
By J. H. EDWARDS

Semi-Portable Plant Prepares Coal From Two Strip Operations 82
By R. R. RICHART

Oil From Coal Nearer as Development Gathers Momentum.. 86
By HON. JENNINGS RANDOLPH

Payroll Work Speeded by Modern Machine Equipment..... 92
By JNO. C. McNEIL

Cables Hung Over Spools on Pipe Standard..... 106

Eyebolts and Pins Split With Cutting Torch..... 108

Manholes Placed in Permanent Overcasts..... 108

Safety Dogs Protect Man-Cars on Slopes..... 110

Adjustment of Steel Regulator Doors Retained by Locks..... 112

Car Retarder Operates From Third Rail..... 113

Special Tongs Help Move Sheet Steel..... 113

Editorials 65

Foremen's Forum..... 98 Questions and Answers.. 102

News Round-Up..... 115 Equipment News 158

CHANGE OF ADDRESS

Director of Circulation, COAL AGE,
330 West 42nd St., New York 18, N. Y.

Please change the address of my COAL AGE subscription as follows:

Name

Old Address

New Address

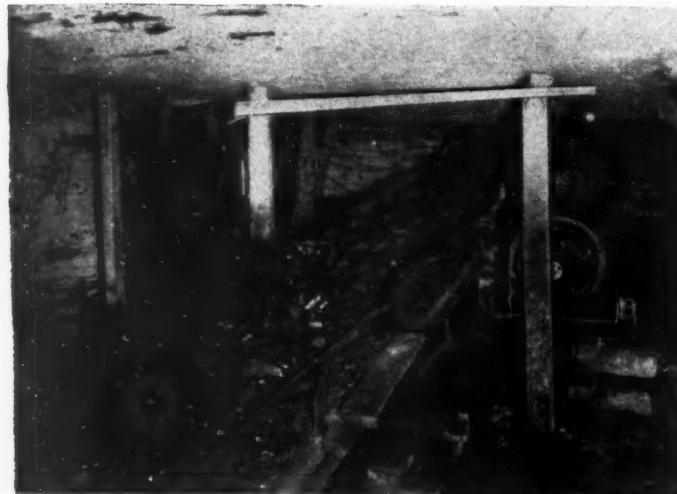
New Company Connection

New Title or Position

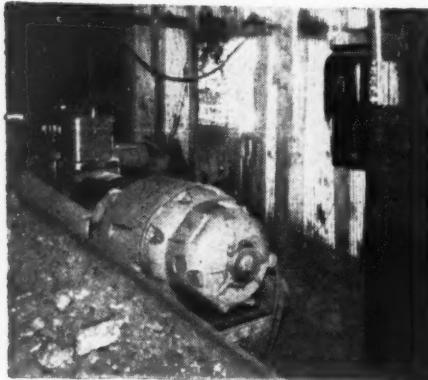
Award Winner



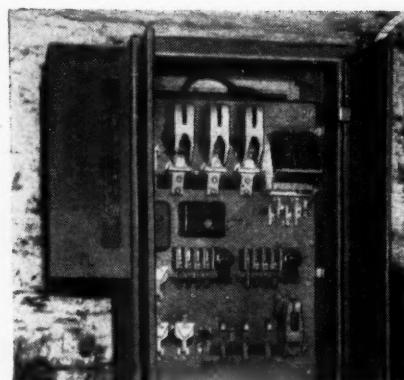
MOVES



Coal on a 30-in. belt, approaching point of transfer to 42-in. belt line.



G-E wound-rotor motors like the one above drive the main conveyor belts. Typical ratings at 40 hp and higher.



G-E combination starters with full undervoltage and overload protection, control all conveyor motors rated 50-hp and higher.



This G-E rotary switch cannot be actuated until a predetermined belt speed is reached. It assures coordinated conveyor speeds.

5,000 TONS A DAY

... on G-E-protected belt system

Mile-long conveyors at North Diamond No. 2 depend on
G-E interlocking drives and controls for high-speed operation
without risking coal pile-ups or personnel hazards.

At the North Diamond No. 2 mine in Earlington, Ky. you won't find idle face loaders waiting for conveyor bottlenecks to clear. That's because this efficiency award-winning mine moves coal *fast* — over 5000 tons of it every 24 hours! This calls for high conveyor speeds without confusion, pile-ups, or accidents. All this is made possible by a highly reliable system of G-E conveyor drives and interlocking controls.

From cross-entry belts straight through to slope belt, conveyor operation is tightly co-ordinated. Neither power interruptions, shutdowns for inspection, nor operators' errors can tangle up this system. Here's what G-E interlocking control does:

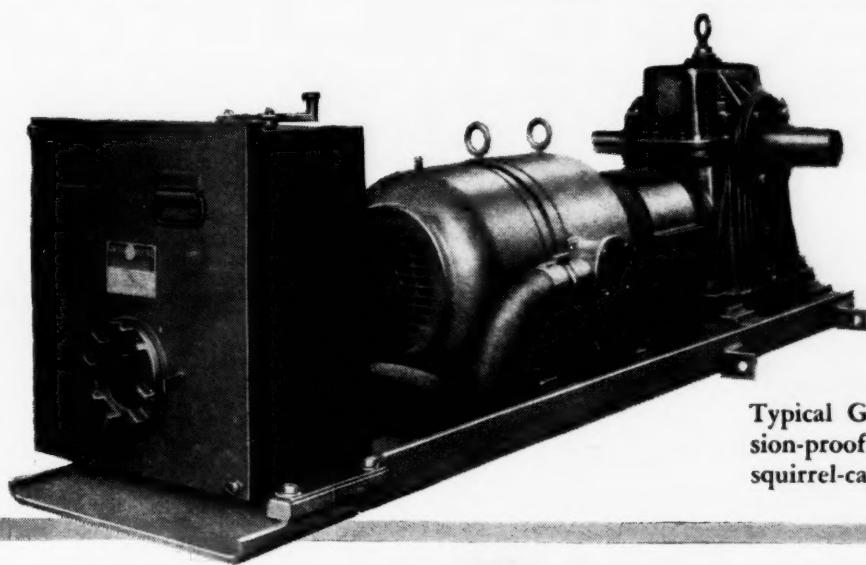
1. It makes every belt start in its proper sequence.
2. It prevents an intermediate belt from starting until the belt preceding it is up to speed.
3. When it stops a belt, it automatically stops all belts feeding it.
4. It reduces spillage possibilities at transfer stations by cutting down belt coasting.

Some of the control developments that made possible these advantages are G-E starters that permit easy motor starting without sacrificing torque, important when belts are fully loaded; G-E relays that respond to control signals over 2500-foot leaps; and a G-E rotary-type switch which precisely times the operation of belt-drive starters.

Greater Safety

Besides the increased output you can expect from G-E interlocking conveyor control, you make more efficient use of power when conveyor motors are prevented from starting all at once. Safety conditions are improved because unexpected restarts are eliminated. Maintenance is less when motors start and operate at the right speeds.

We will be glad to discuss ways and means of applying this new system of conveyor control in your mines. Just call the nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



Typical G-E a-c full-voltage explosion-proof starter, connected to a G-E squirrel-cage induction motor.

GENERAL  **ELECTRIC**

667 54-148

Only A-C Builds

→ { ...THE WORLD'S LARGEST
LINE OF BASIC PROCESS-
ING EQUIPMENT...

BUYING COMPLETE EQUIPMENT at one time saves trouble and expense. And as a rule it means better engineering—since *one* supplier is responsible for its performance. The customer gains, either through increased production or lowered costs.

A-C BUILDS EQUIPMENT COMPLETE

If you profit in dealing with one source, think how much more it will mean to you when you specify A-C equipment. For Allis-Chalmers is the *only* company that builds basic processing machinery, as well as motors and drives! This fact is also reflected in our engineering. The A-C men you deal with are *complete-line* engineers — familiar with every step in the basic processes. They are qualified to figure both your mechanical and electrical needs . . . and correlate the two into a smooth-running, productive team.

REPUTATION FOR QUALITY MACHINERY

Even when you purchase individual A-C equipment, like motors and drives, for existing machinery you are assured of as *good* . . . and in many cases *better quality* equipment than you can find anywhere on the market. Next time you're pressed with equipment problems, why not find out how A-C can help you. Call our nearby district office, or write direct to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

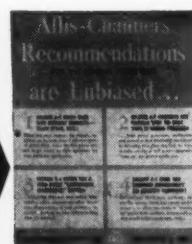
A 2005



SCREENS

Modern engineering—giving you more screen for less money—typifies the 8 different types of vibrating screens which A-C builds. "Stress-relieving" scientifically designed support frames, many other features contribute to longer screen life, low maintenance.

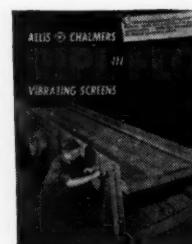
Send
for These
FREE
HELPS!



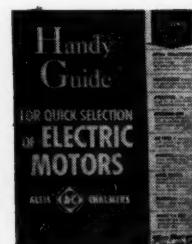
Complete Line of A-C equipment for Process Industries. Bulletin B6166D.



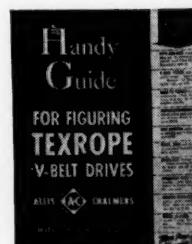
"Low-Head" Screens—3 x 6 to 6 x 16 ft—in 1, 2 or 3 decks. Bulletin B6330.



"Rippl-Flo" Screens—3 x 6 to 6 x 16 ft—in 1, 2 or 3 decks. Bulletin B6151B.



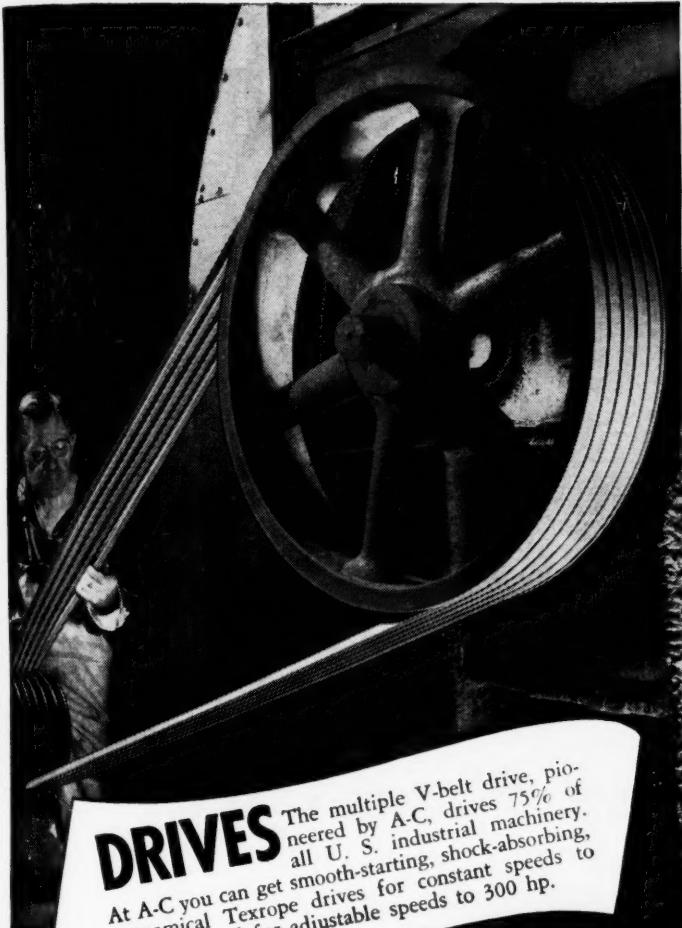
Electric Motors—engineering data, prices, sizes of belts, sheaves, etc. Bulletin B6052F.



Texrope Drives—prices, sizes of belts, sheaves, etc. Bulletin B6051F.

All Three!

{ ...THE WORLD'S WIDEST
LINE OF V-BELT DRIVE
EQUIPMENT...



DRIVES

The multiple V-belt drive, pioneered by A.C., drives 75% of all U. S. industrial machinery. At A-C you can get smooth-starting, shock-absorbing, economical Texrope drives for constant speeds to 6000 hp; and for adjustable speeds to 300 hp.

{ ...AND A COMPLETE
LINE OF MOTORS WITH
WHICH TO DRIVE THEM!

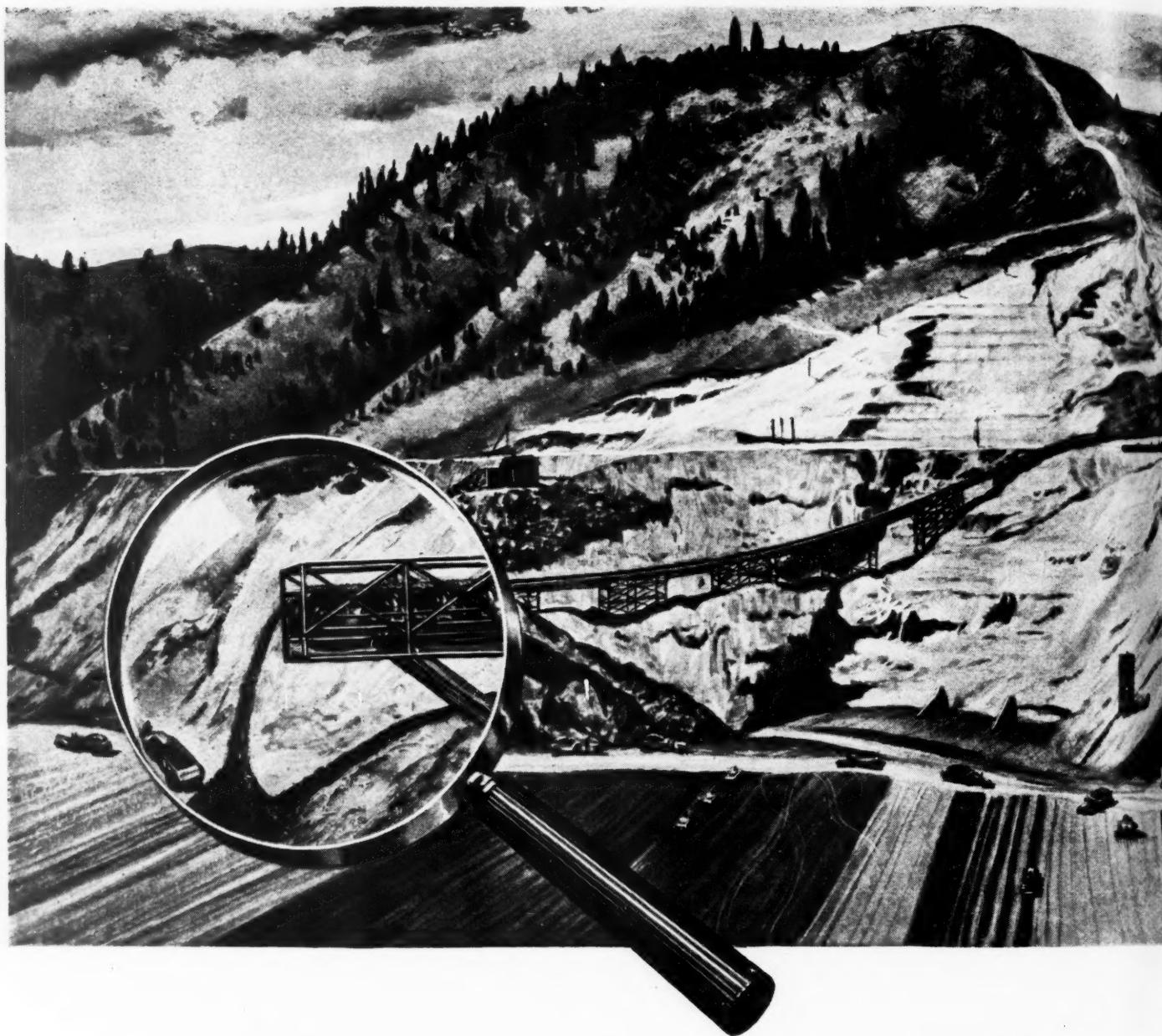


MOTORS

Allis-Chalmers' complete line of motors in all ratings to 10,000 hp have a reputation for sturdiness and ability to handle overloads. That's because they're generously proportioned, have high factor of safety built-in.

ALLIS CHALMERS

*The Only Company that Builds Processing
Equipment Complete with Motors and Drives!*



The Way Over the Mountain

Another first for the "rubber railroad"

How would you go about transporting six million cubic yards of impervious clay—weighing more than 8,000,000 tons—across two miles of mountain range, then down to the bottom of a precipitous canyon 1,000 feet deep?

Back in 1941 that weighty problem confronted the contractors of the gigantic Anderson Ranch Reclamation Dam job in Idaho. Plans called for the erection of the world's

highest earthwork dam. It was to be 1,350 feet wide, 2,600 feet thick at the base and 456 feet high across the gorge of the south fork of the Boise River. The descent from the clay pit in the mountains to the dam site in the canyon was far too steep for any wheel- or rail-borne carrier to negotiate.

But that didn't worry the engineers. They knew the marvels in bulk transport accomplished by

Goodyear "rubber railroad" conveyor belt systems. So they called in the G.T.M. — Goodyear Technical Man. After careful analysis, he submitted plans for a system of nine Goodyear conveyor belts snaking around and down the mountain from pit to dam—a two-mile, roller-coaster flight descending 1,193 feet over grades as steep as 32% in some sections.

This Goodyear rubber railroad has



now been in service nearly three years. In every hour of operation it has delivered 1,280 tons of impervious clay to the site of the dam. And today the 30,000 feet of Goodyear belting in the installation still looks good as new!

See it in the movies

To show engineers and contractors just how effectively the rubber railroad is handling this "impossible" job, a full-color documentary sound film, entitled "The Way Over the Mountain," has been made. It is now ready for showing to all groups interested in lowest-cost-per-ton transport of bulk materials — sand, gravel, aggregate, coal and ores. To see it, just send a request to the G.T.M., Goodyear, Akron 16, Ohio or Los Angeles 54, California.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS



G.T.M.-Specified
CONVEYOR BELT HAULAGE SYSTEM
for Anderson Ranch Dam, Morrison-Shea-Twalfs-Winston
Company, Contractors

FOR HOSE, BELTING, MOLDED GOODS, PACKING and
TANK LINING built to the world's highest standard of
quality, phone your nearest Goodyear Industrial Rubber
Products Distributor.

GOOD YEAR

THE GREATEST NAME IN RUBBER

PROTECTING WIRE ROPE AND OPEN GEARS

How it's done on
this "Bigger Digger"

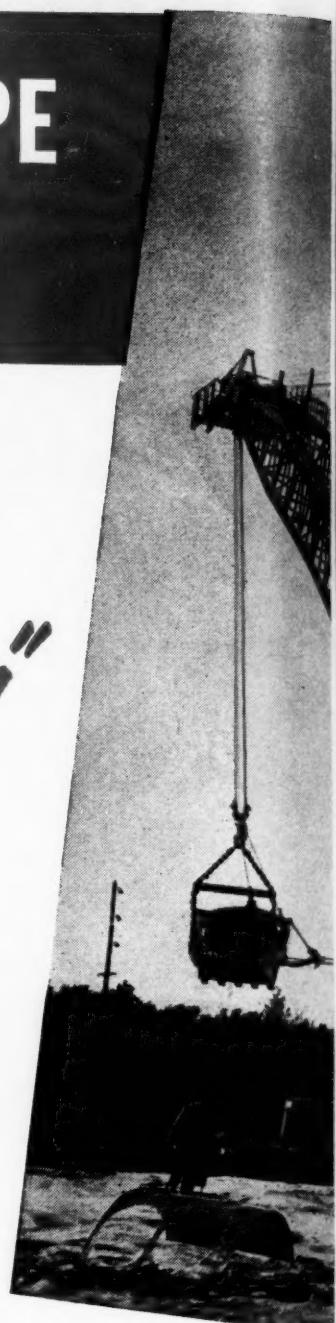
INTERNATIONAL Minerals & Chemical Corporation operate this giant dragline, said to be the world's largest, in the mining of phosphates in Florida. They say:

"We are using Texaco products in the lubrication of the 'Bigger Digger', and have a regular lubrication schedule posted on the machine in several places. We are using Texaco Crater No. 1 on hoist cables, circle rails and rollers; and Crater No. 3 on open gears, and hoist and boom cable drum faces."

Texaco Crater has been used by operators everywhere for more than 30 years. Crater is especially designed to keep wire rope in prime condition. It fights friction, reduces wear, and prevents rust. It penetrates . . . preserves the core and keeps rope flexible and strong longer.

On open gears, Texaco Crater assures equally effective lubrication. It cushions shocks, protects against heavy loads, quiets noise, and greatly reduces wear.

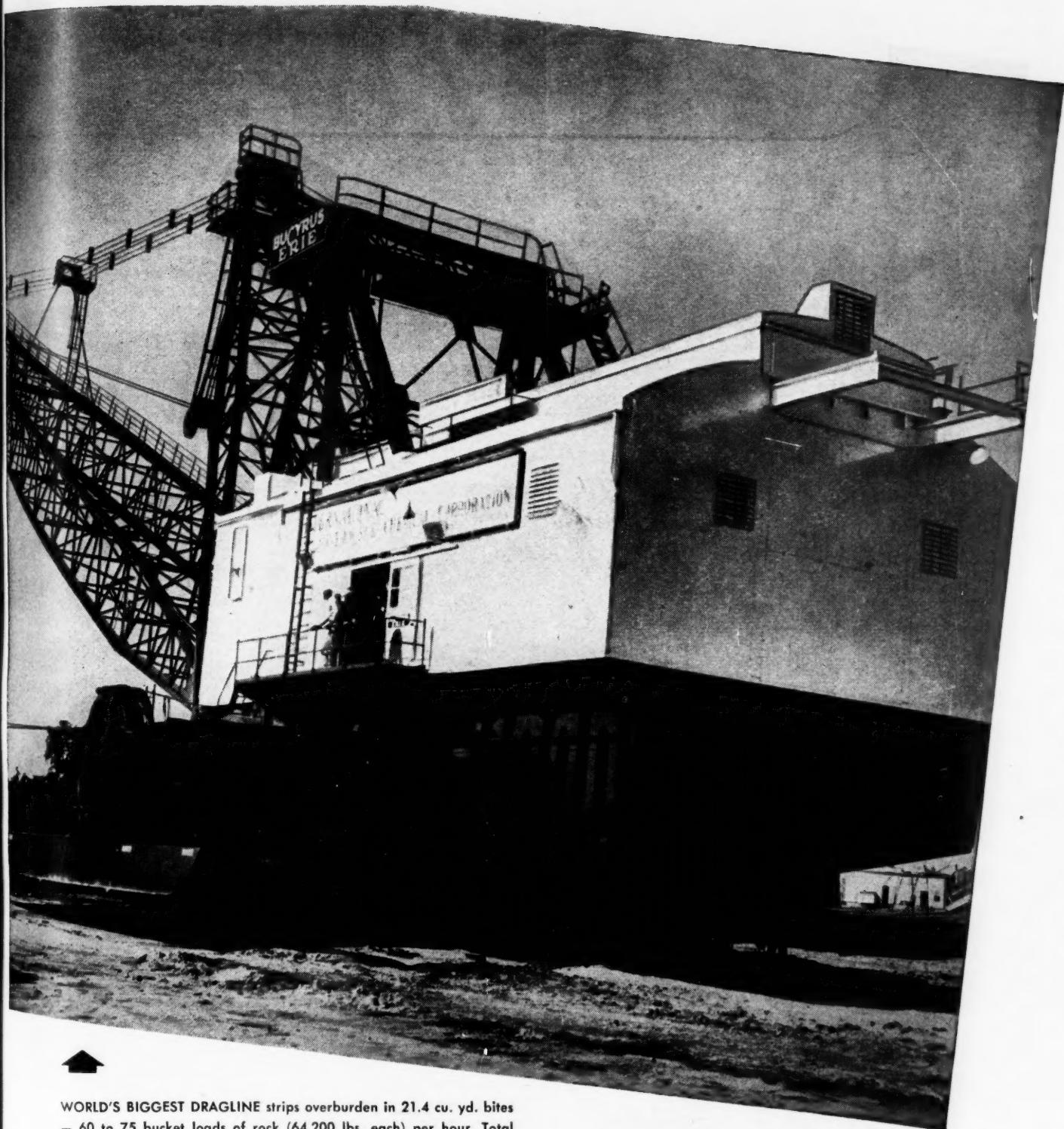
For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, National Sales Division, Dept. C, 135 East 42nd Street, New York 17, N. Y.



TUNE IN THE
TEXACO STAR THEATRE
EVERY SUNDAY NIGHT
WITH JAMES MELTON
— CBS



TEXACO LUBRICANTS

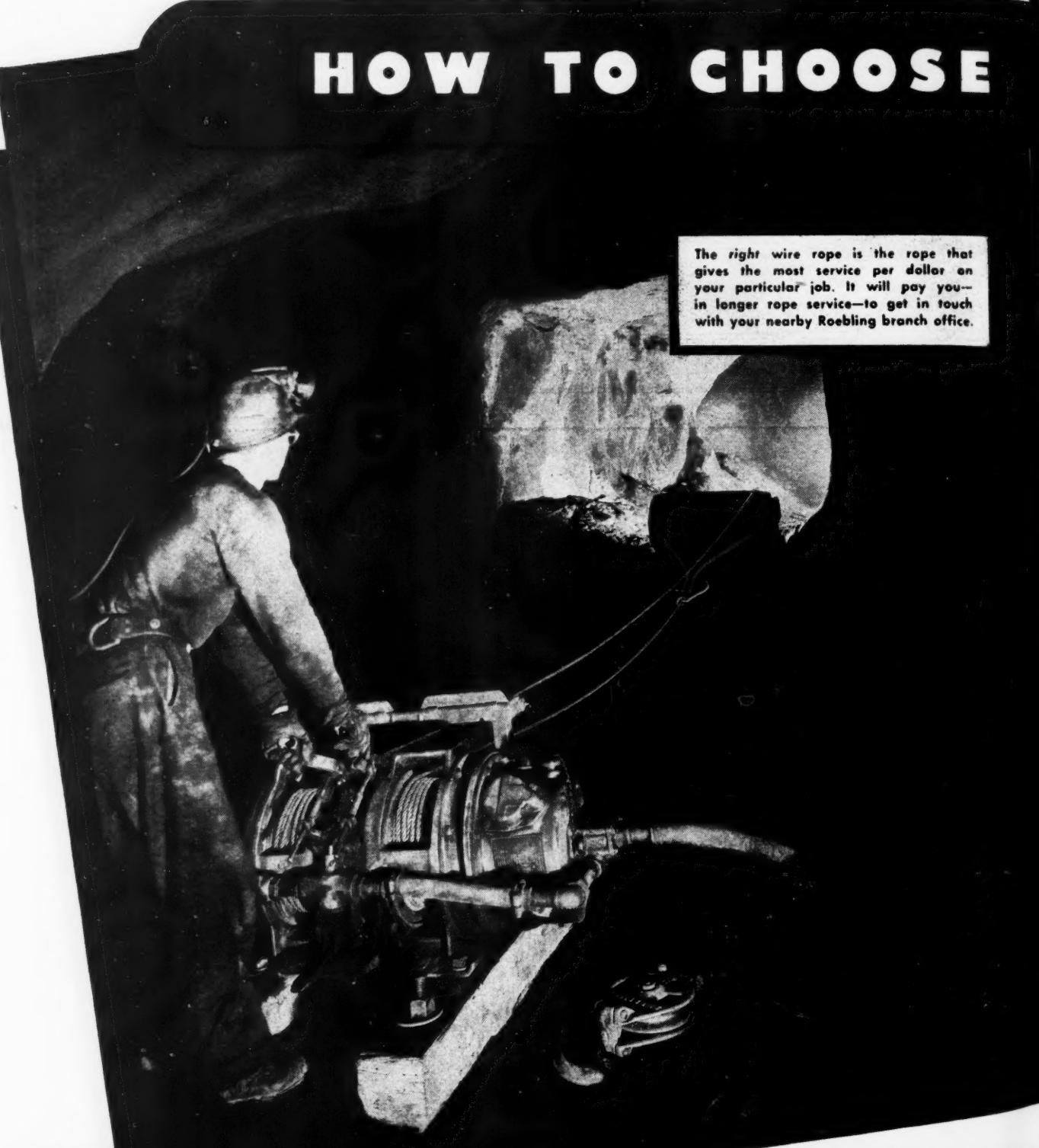


WORLD'S BIGGEST DRAGLINE strips overburden in 21.4 cu. yd. bites
— 60 to 75 bucket loads of rock (64,200 lbs. each) per hour. Total
weight is 2,571,000 lbs.; boom 215 ft. long; walking speed 0.11
m.p.h.; combined horsepower 1,750; largest rope diameter 2½ in.
Wire rope and open gears are protected with Texaco Crater.

For the Coal Mining Industry

HOW TO CHOOSE

The right wire rope is the rope that gives the most service per dollar on your particular job. It will pay you—in longer rope service—to get in touch with your nearby Roebling branch office.



MANUFACTURERS OF

Wire Rope and Strand • Fittings • Slings • Aircord, Aircord Terminals and Air Controls • Suspension Bridges and Cables • Aerial Wire Rope Systems • Ski Lifts • Electrical Wire and Cable • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Screen, Hardware and Industrial Wire Cloth • Lawn Mowers

ROE

THE RIGHT ROPE

...and get lowest handling cost!

YOU DON'T ALWAYS have the time to study the often obscure details affecting wire rope service on your installations. But your Roebling Field Engineer is constantly making such studies.

His daily contacts include tracking down the facts on practically every type of wire rope installation. He has specialized knowledge of wire rope usage . . . and of wire rope, too.

After careful study the Roebling Field Engineer can help you choose the *right* rope . . . the one that will give you top service per dollar. Of course, he will recommend Roebling "Blue Center" Steel Wire Rope. For here is a complete line—both preformed and non-preformed—where he can find the wire rope that combines the right balance of strength and flexibility, of fatigue and abrasion resistance.

Call or write our nearest branch office. Get in touch with your Roebling Field Engineer.

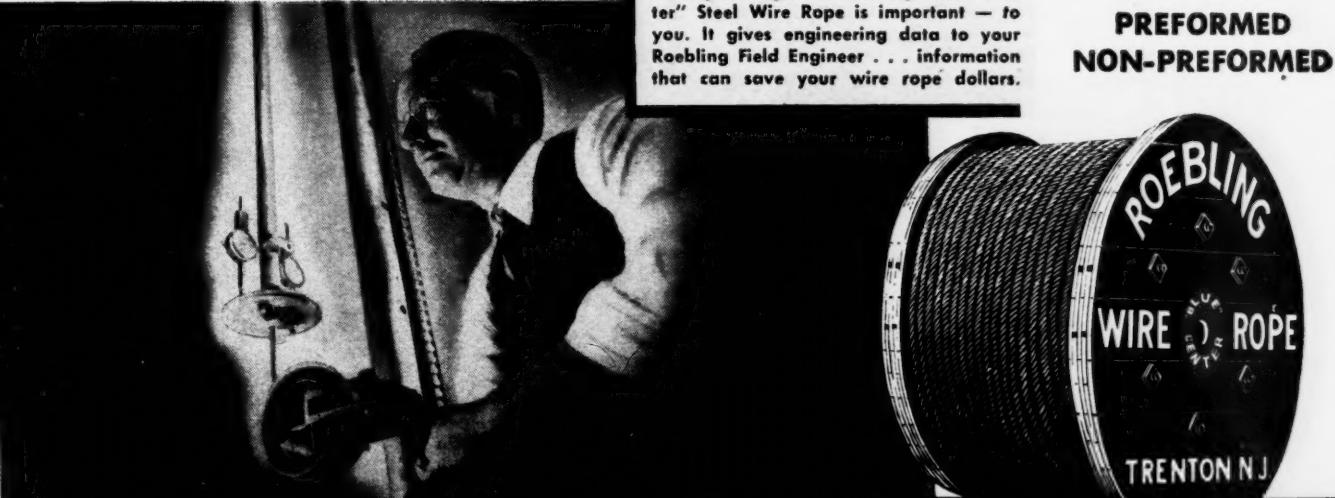
JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

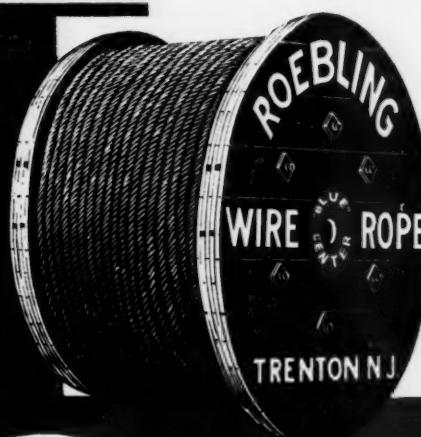
Branches and Warehouses in Principal Cities

Testing a length of Roebling "Blue Center" Steel Wire Rope is important — to you. It gives engineering data to your Roebling Field Engineer . . . information that can save your wire rope dollars.

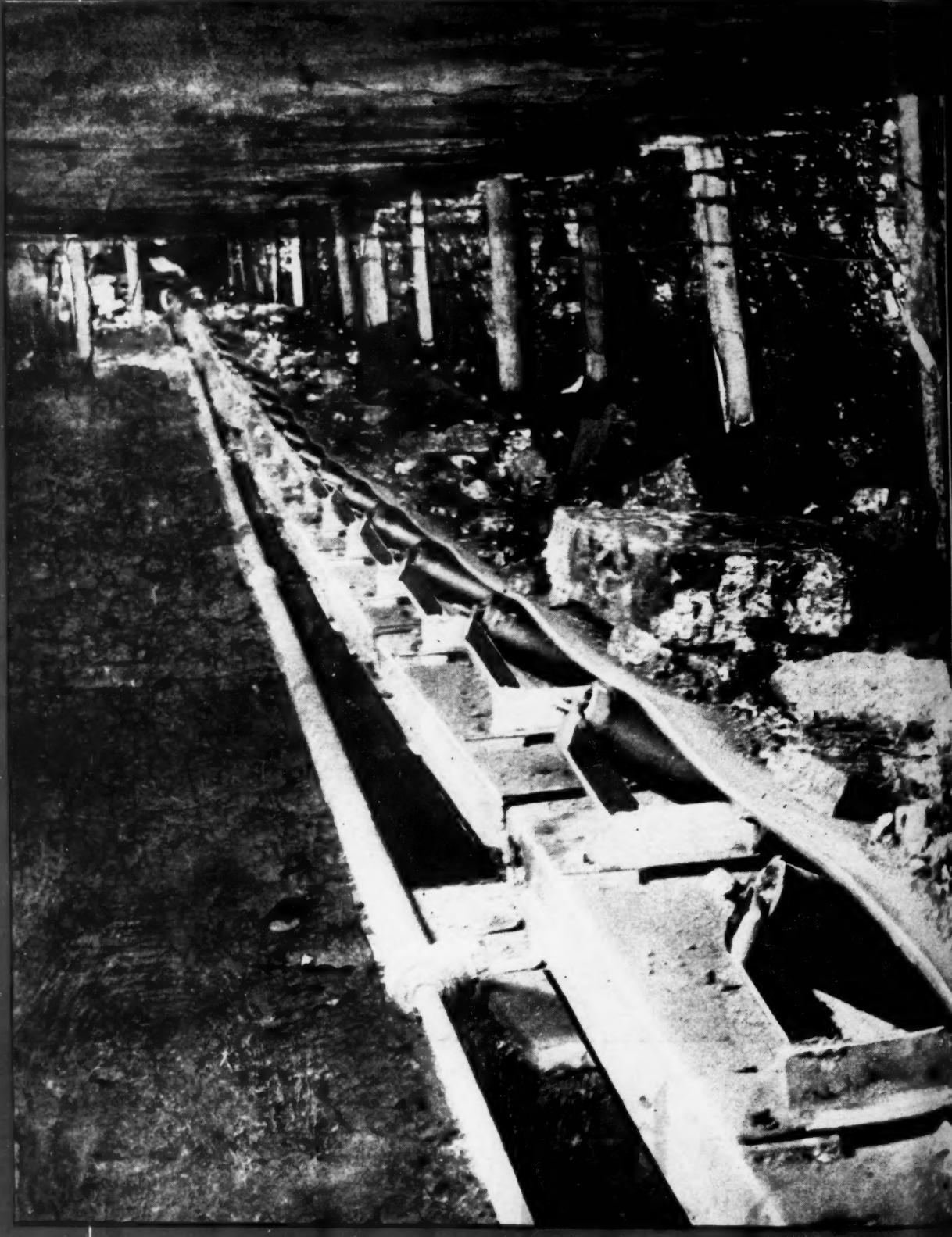
**PREFORMED
NON-PREFORMED**

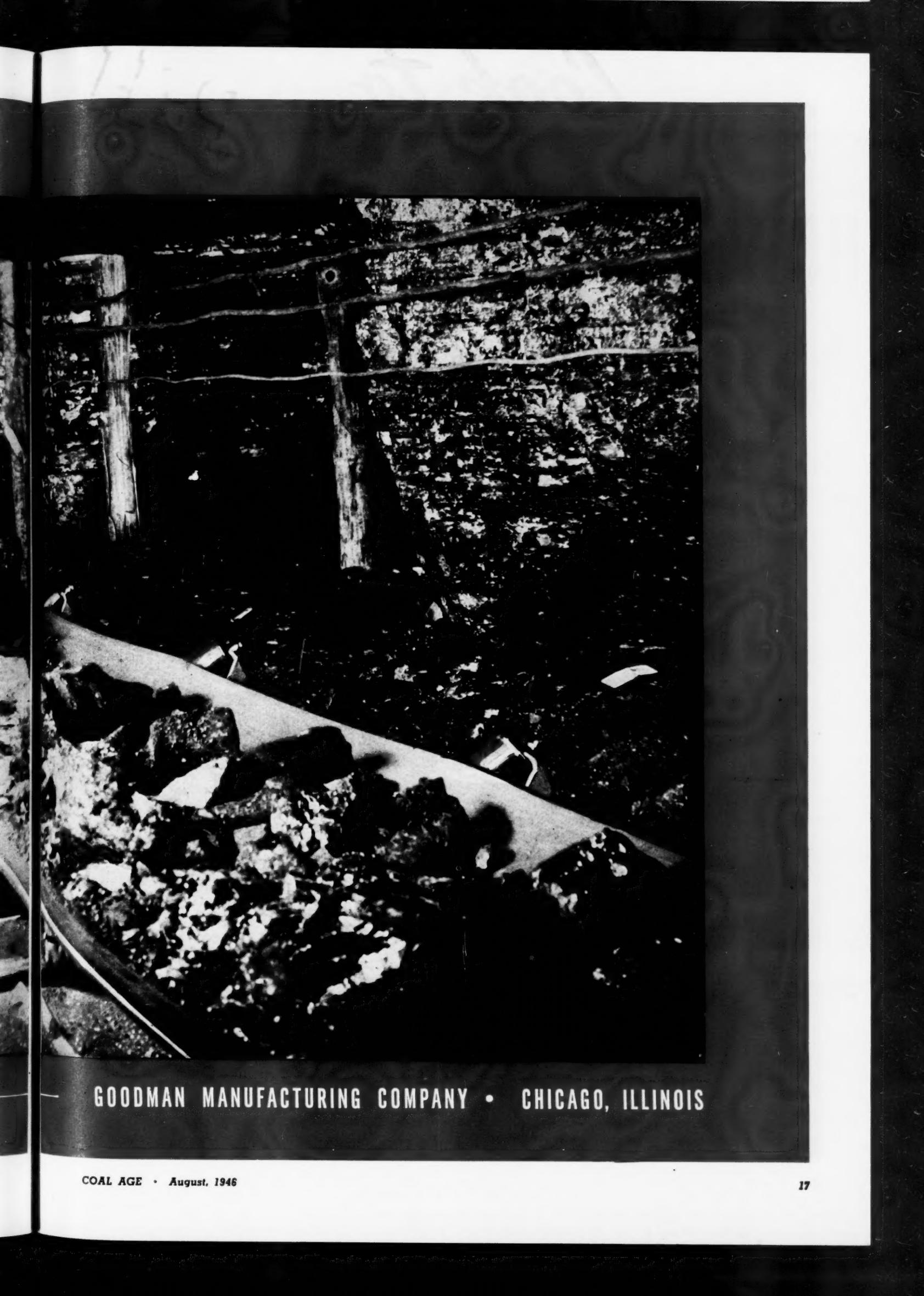


BLING



A complete line of belt conveyors
to meet every mine condition and
capacity requirement.

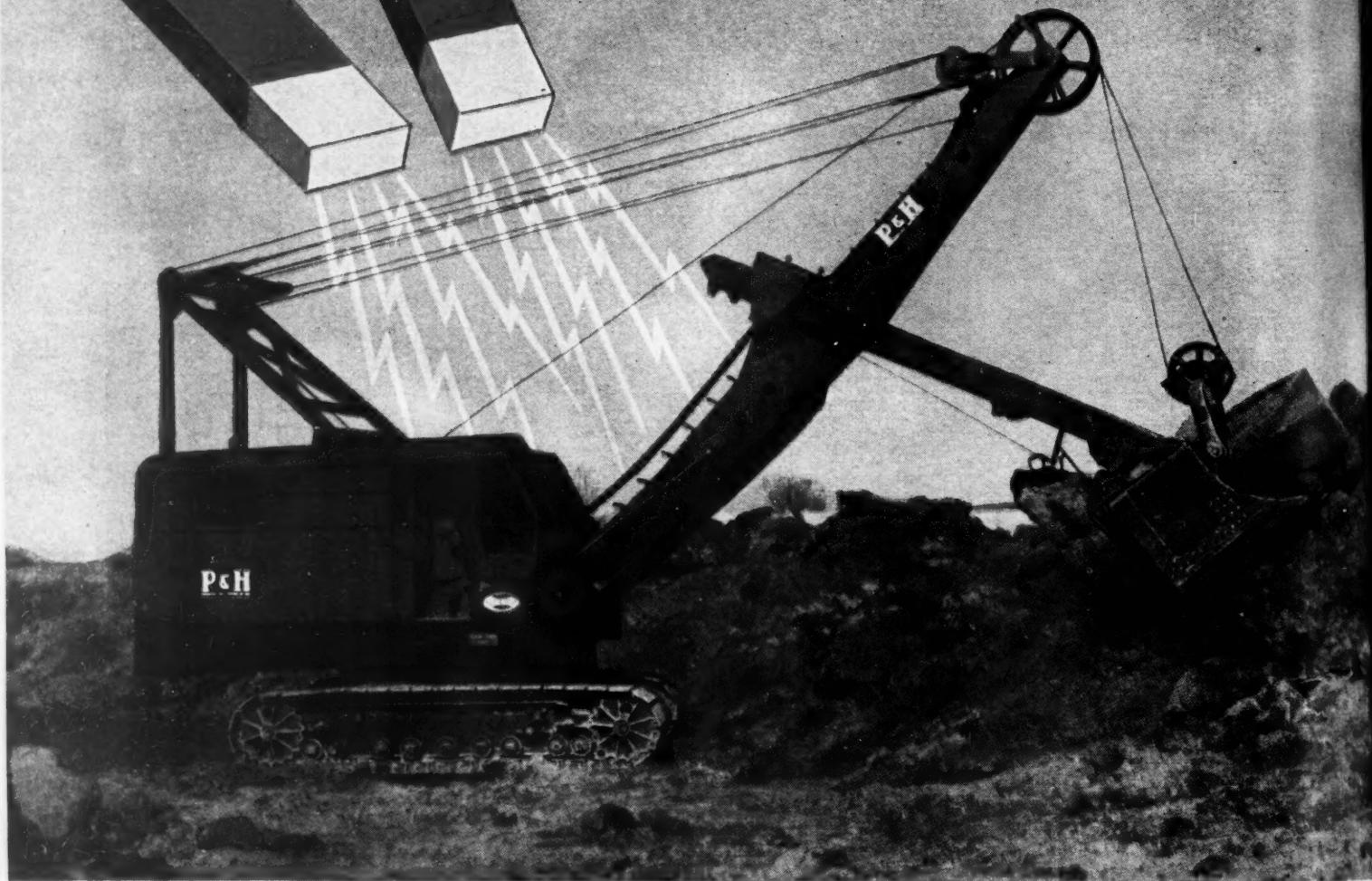




GOODMAN MANUFACTURING COMPANY • CHICAGO, ILLINOIS

Look to **P&H**

HOW A MAGNET *Eliminated* SWING CLUTCH TROUBLES



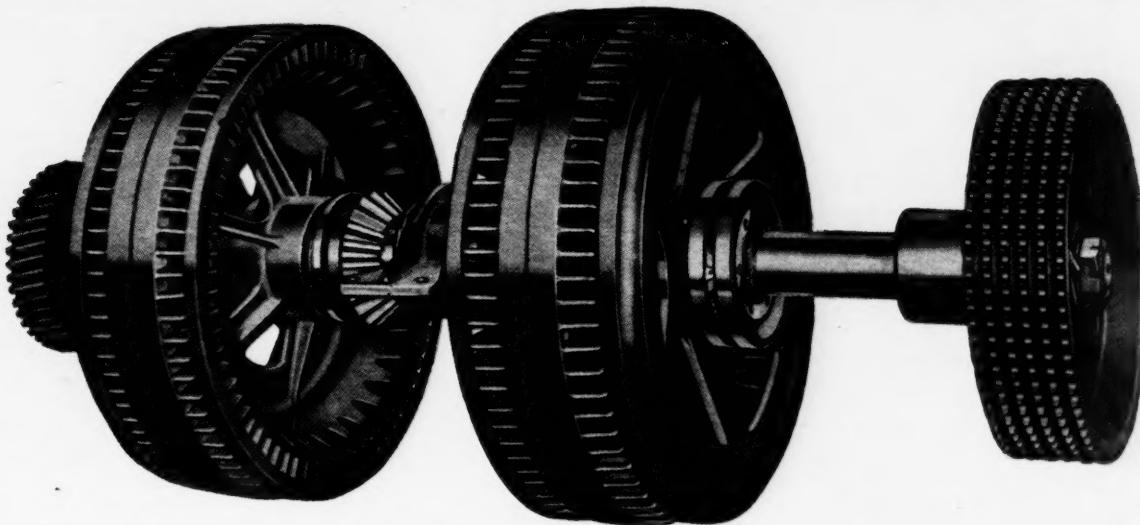
**Swing Frictions are out . . . Maintenance is Reduced
... Operation is Smoother, Faster**

Here's one of the most important developments in the field of large excavators in the past 20 years—the P&H Magnetorque Swing Unit. By employing electro magnetic forces instead of the usual mechanical swing clutches, P&H has eliminated the greatest single source of wear—and trouble—on large friction machines. You will have none of the old maintenance problems—no more linings to replace, no adjustments to make. For there is no wear—no mechanical contact between driving and driven members. The P&H Magnetorque Swing Unit will last the entire life of the machine.

Now offered as standard equipment on the P&H Model 1055, the Magnetorque Swing unit results in higher operating efficiency, smoother, faster swinging and steadier digging with cushioned acceleration and deceleration.

On large construction projects or in open pit mines and quarries where profits depend upon continuous operation, the Magnetorque is another P&H added value that pays for itself many times over. The operator, too, will like its many advantages. Ask for complete information.

for Added Values



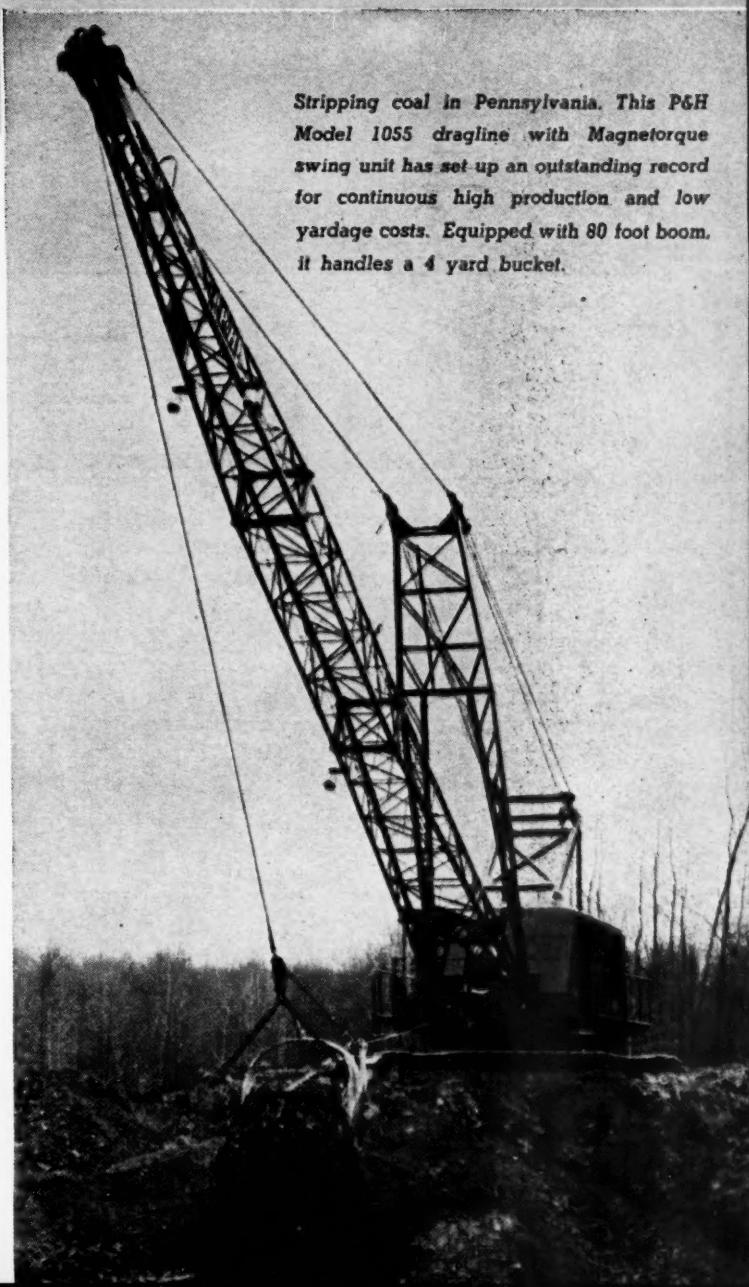
The NEW P&H MAGNETORQUE Swing Unit

Mounted in the same relative position on the machine as the old style swing jackshaft assembly, the Magnetorque units, carried on self-lubricated anti-friction bearings, transmit power for both swing and propel motions. But there is no friction—no mechanical linkages—no metal-to-metal contact. Instead, there is only a gap of air through which electro-magnetic forces are transmitted. Excitation is supplied by a small generator on the main engine and controlled from the operator's station.

Always the hardest-working part of an excavator, the swing unit has now become one of the simplest and least troublesome. Maintenance is reduced to a new minimum. Swing speeds are higher, too, with more accurate starting and stopping. And steadier, easier digging increases daily output.

P&H Excavators are built in sizes up to 6 cubic yards, gasoline, Diesel or electric power. Ask for literature on the size you need.

Stripping coal in Pennsylvania. This P&H Model 1055 dragline with Magnetorque swing unit has set up an outstanding record for continuous high production and low yardage costs. Equipped with 80 foot boom, it handles a 4 yard bucket.



P & H EXCAVATORS

HARNISCHFEGER
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS

4540 W. National Ave.

Milwaukee 14, Wis.



THIRD DEGREE...

After he has subjected a problem of handling bulk material to a rigorous "third degree" . . . after he has exposed its smallest detail to the penetrating light of searching analysis—only then is an S-A engineer ready to work out the solution.

It is this exhaustive consideration of every factor that enables an S-A engineer to specify the exact system needed . . . to convey the *right* volume to the *right* place, at the *lowest* cost per ton. It is his wide experience, augmented by constant collaboration with a group of pro-

gressive conveyor engineers, that makes his recommendation authoritative.

Just as thorough as his examination of a problem, is an S-A engineer's choice of equipment. He has an *unrestricted choice* from a complete line of conveyors and accessories—products of the company that for 45 years has led the field with new units and new methods.

If you want the man whose "third degree" brings maximum efficiency to bulk material handling, talk to an S-A engineer.



S T E P H E N S-A D A M S O N

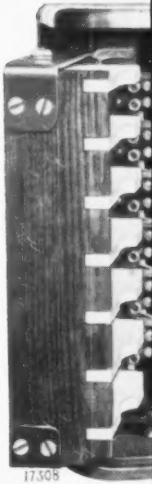
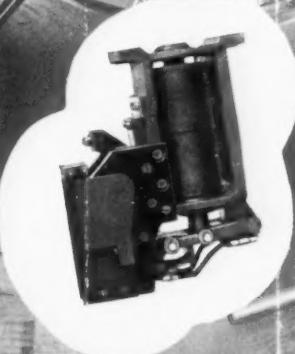
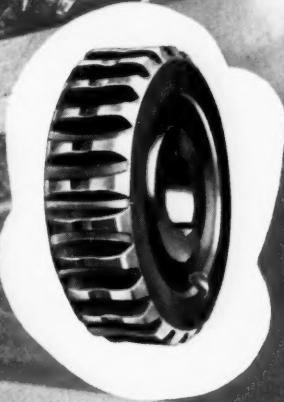
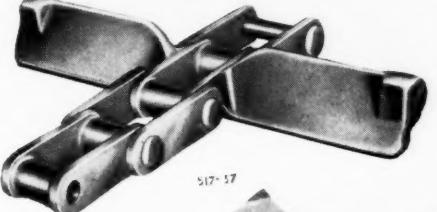
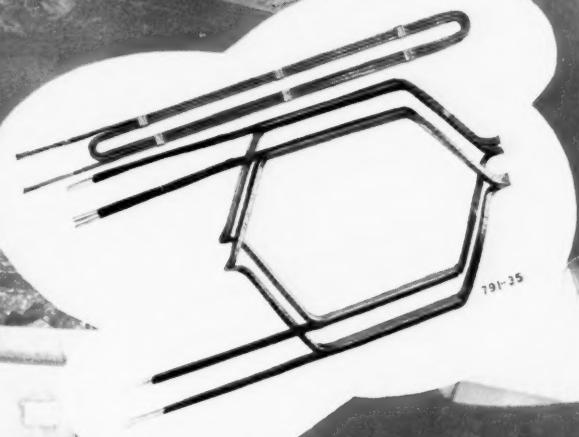
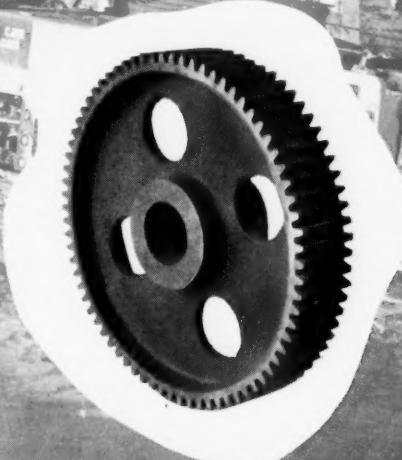
3 RIDGEWAY AVENUE, AURORA, ILLINOIS

MFG. CO.

LOS ANGELES, CALIF. • BELLEVILLE, ONT.

*Designers and Manufacturers of All Types of
BULK MATERIAL HANDLING EQUIPMENT*

JEFFREY GENUINE RENT



JEFFREY RENEWAL PARTS

Economical maintenance of the wide range of Jeffrey equipment operating in all the coal-producing states can be most successfully handled with Jeffrey Genuine Renewal Parts. They are designed and manufactured for the equipment . . . Parts that fit easily and quickly into place. Specify Jeffrey on your Renewal Parts.



Did you

That between Pearl Harbor and V-J Day more than 2,200,000,000 tons of bituminous coal were produced, an average of nearly 2,000,000 a working day . . . that more bituminous coal was mined in the United States in 1945 than in all the rest of the world combined.

know?

That Genuine Jeffrey Renewal Parts offer many plus values as a result of . . . discriminating selection of material, proper heat treatment, precision manufacture and careful inspection . . . to insure proper fit and better service.



T

Sale

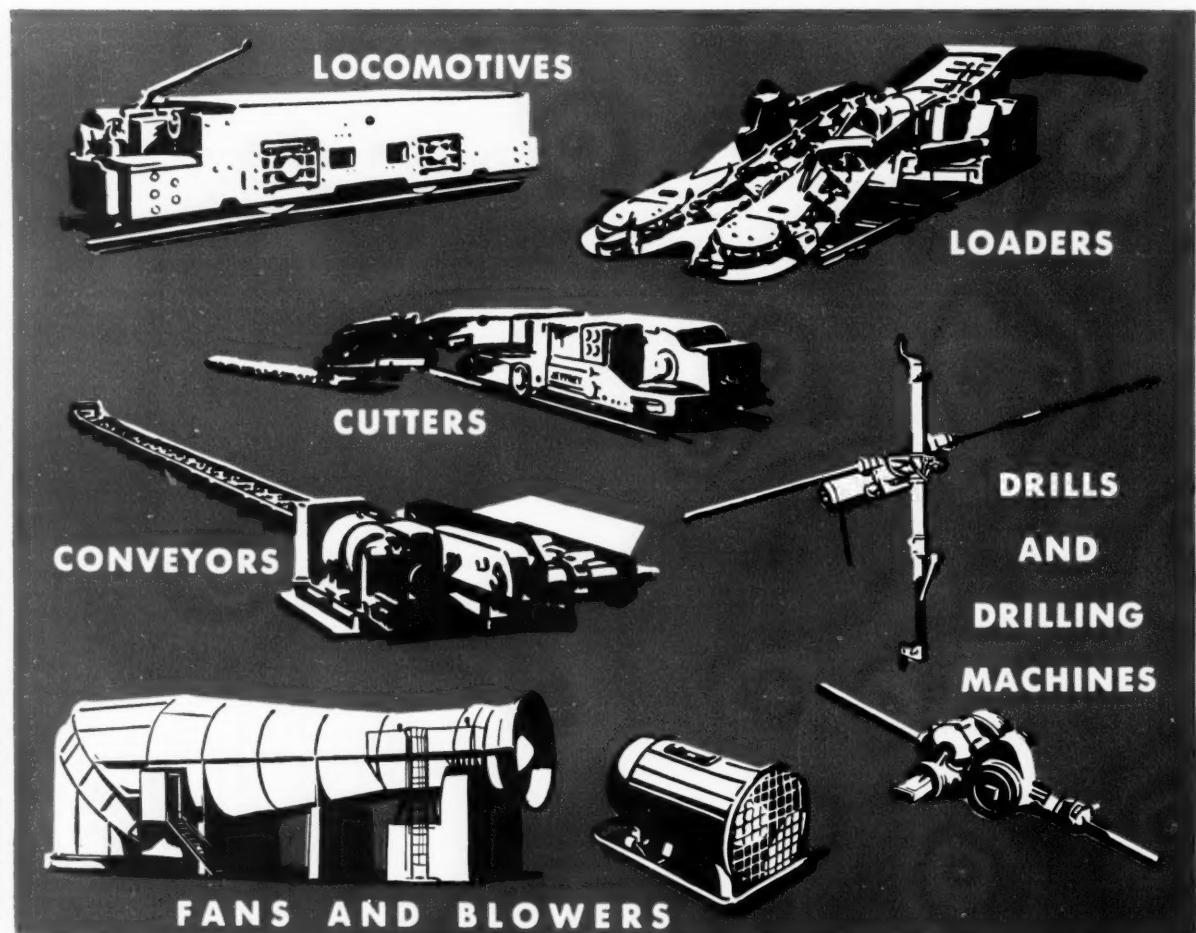
Serv

For

Jeffrey

EQUIPMENT FOR COAL MINES

JEFFREY SERVICE TO THE COAL MINES
MEANS SERVICE TO ALL INDUSTRY



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:

Baltimore
Birmingham
Boston
Buffalo

Chicago
Cleveland
Cincinnati
Detroit

Denver
Harlan
Houston
Huntington

Milwaukee
New York
Philadelphia
Pittsburgh

Scranton
St. Louis
Salt Lake City

Service Stations:

Pittsburgh
Harlan, Ky.

Birmingham
St. Louis

Logan-Buckley
W. Va.

Scranton

Foreign Plants:

Jeffrey Mfg. Co., Ltd.
Montreal, Quebec

British Jeffrey-Diamond, Ltd.
Wakefield, England

Jeffrey-Galion (Pty), Ltd.
Johannesburg, S. A.



Tough.. Lively ...COOL-RUNNING

War-time Shortage Produced a BETTER RUBBER for TEXROPE V-BELTS

LACK of natural rubber forced the development of synthetic rubbers. And out of this intensive war-time research came a rubber compound that has made today's TEXROPE "Super-7" V-Belts the BEST in 20 years of V-Belt experience!

This war-proved Buna-S develops 75% less internal heat. It's tough, durable, resilient. It cushions, insulates and protects the load-carrying cord structure — adds to the service life of the belt.

HEADQUARTERS FOR V-BELT DRIVES

Your nearest Allis-Chalmers office or dealer offers a COMPLETE line of V-Belt equipment — not only the famous Super-7 belts, but also TEXSTEEL, TEXDRIVE and "MAGIC-GRIP" sheaves, VARI-PITCH sheaves, SPEED CHANGERS, engineering service. Supply *all* your needs from one reliable source. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2086

5 Super-7 V-Belts ... TO MEET EVERY NEED



Heat-Resisting Super-7

Stands temperatures up to 180°. The TEXROPE V-Belt for most drives.



Oil-Resisting Super-7

Neoprene cover protects core against moderately oily or greasy conditions.



Oil-Proof Super-7

Made of Neoprene throughout. Use it when the belt must swim in oil.



Static-Resisting Super-7

Recommended where explosion hazard exists. Static-conducting element throughout cover won't wear off.



Super-7 Steel

Twin steel cables, to pull extremely heavy loads with minimum stretch. GET THEM — through your Allis-Chalmers district office or dealer.

TEXROPE Super-7 V-Belts result from the co-operative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.

ALLIS CHALMERS

One of the Big 3 in Electric Power Equipment—
Biggest of All in Range of Industrial Products

TEXROPE V-BELT DRIVES



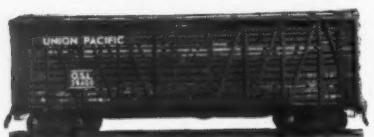
(3) The Covered Hopper Car



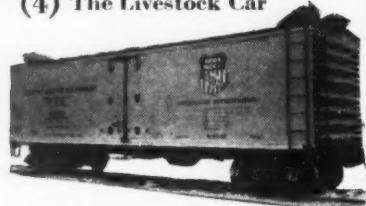
(2) The Tank Car



(1) The Hopper Car



(4) The Livestock Car



(5) The Refrigerator (P.F.E.) Car



(6) The Box Car



(7) The Gondola



(8) The Flatcar



(9) The Automobile Car



Transportation Tailored to Your INDUSTRY

To most effectively meet the needs of American Industry, Union Pacific provides a fleet of freight cars specifically designed to transport all types of materials and merchandise.

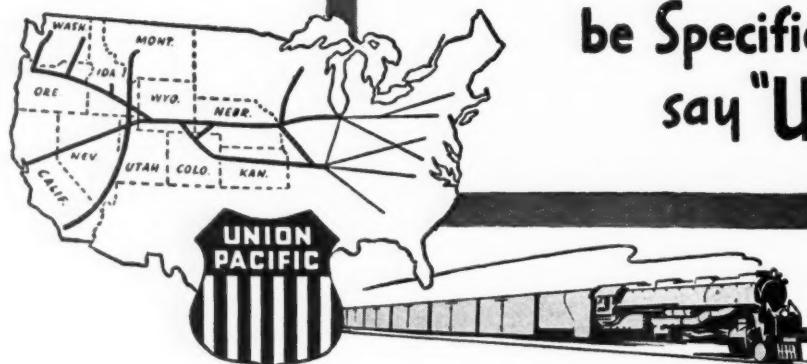
Sturdily constructed and efficient in mechanical operation are the various types of freight cars pictured on this page. This safe, dependable rolling stock is a vital factor in providing transportation for the commerce of the nation.

Of special interest to the Coal Industry are the gondola and hopper cars, Figs. 7 and 1. The railroad industry is one of the nation's largest consumers of coal.

The trained knowledge and experienced skill of thousands of Union Pacific employees keep shipments rolling on schedule over the time-saving Strategic Middle Route, uniting the East with the West Coast. Experienced traffic specialists, from coast-to-coast, are ready to assist you. Let them help you with your next shipment.

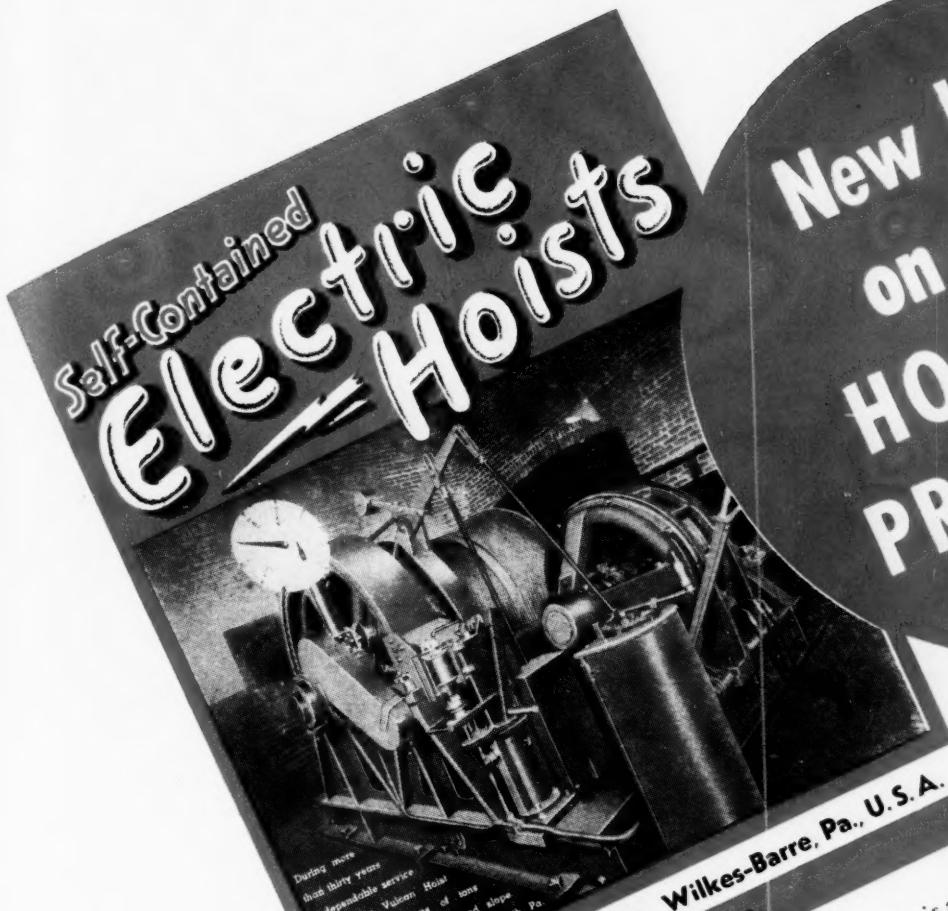
For fast, dependable service . . .

be Specific -
say "Union Pacific"



★ Union Pacific will, upon request, gladly furnish industrial or mercantile concerns with information regarding available sites having trackage facilities in the territory it serves. Address Union Pacific Railroad, Omaha 2, Nebraska.

UNION PACIFIC RAILROAD
The Strategic Middle Route



Ask for
free
Bulletin
A-407

HEAVY-DUTY ELECTRIC HOISTS
SELF-CONTAINED HOISTS
SCRAPER HOISTS • CAR-SPOTTING HOISTS
ROOM HOISTS • "ALLCASTEEL" SHEAVES
SHAKING-CHUTE CONVEYORS • CHAIN CONVEYORS
CAGES, SKIPS, GUNBOATS • COAL-PREPARED EQUIPMENT • STEAM LOCOMOTIVES • GASOLINE AND DIESEL LOCOMOTIVES • DIESEL ELECTRIC LOCOMOTIVES • LOAD CARRYING LARRYS STEEL CASTINGS • STEEL FABRICATION

Vulcan Iron Works, Wilkes-Barre, Pa., U.S.A.
BULLETIN No. A-407

This comprehensive catalog on Electric Hoists is a "must" for every wide-awake mining man. Just off the press, it offers a wealth of specific information on Vulcan Hoists never before offered in print.

In its 28 fact-filled pages you'll find Vulcan's complete story on Self-Contained Hoists, Scraper Hoists, Car-Spotting and Room Hoists. Vulcan's modern safety devices for Shaft and Slope Hoists get full coverage, too. And this information is especially timely now in view of steadily tightening safety requirements.

Highlights of Vulcan Heavy-Duty Hoists, "Allcasteel" Sheaves, Cages and Skips, Slope Rollers and plant facilities all are outlined in this factual handbook. Studded with illustrations, detailed descriptions and pertinent tables, it's an invaluable source of information. Write today for your free copy. Specific inquiries are invited, also, on any of the Vulcan-manufactured equipment listed.

Vulcan Iron Works

WILKES-BARRE, PA., U. S. A.
Cable Address: "Vulworks, Wilkes-Barre."
Branch Offices: New York, Chicago, Washington, D. C.

"Tense? NOT ME!"



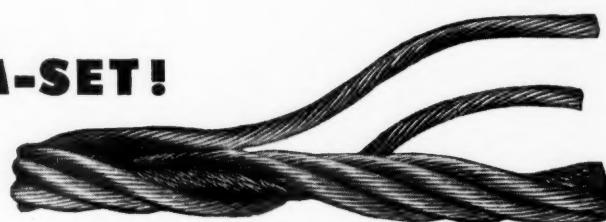
Maybe he doesn't know it, but he's taking the world's best medicine—relaxation. No locked-up stresses in *him*.

Tense? NOT FORM-SET!

A preformed rope is relaxed, too—relaxed internally, just like the man. But, in the case of the rope, that inner, relaxed effect is permanent. Preforming does it.

Bethlehem Form-Set (preformed) rope is remarkably free of internal stresses. In wire rope language, it is much less susceptible to bending fatigue.

A Form-Set rope is good-natured . . . easy to handle, easy to rig. And you'll find that it doesn't kink readily. Try it and see what *built-in relaxation* means to rope!



This is a cut section of Form-Set rope. The wires and strands cannot spring up by themselves; in this case, they have been lifted out by hand.

Even when cut or broken, the wires and strands of a Form-Set rope are relaxed, free of locked-in tension; lie smoothly and easily in place.

All grades, sizes, and types of Bethlehem wire rope can be obtained with the Form-Set construction.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation*



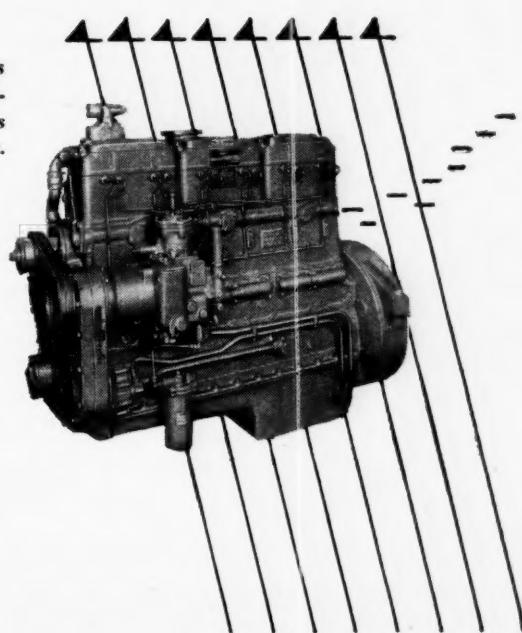
When you think WIRE ROPE . . . think BETHLEHEM



**A sound investment in power . . .
proved on countless jobs such as yours.***

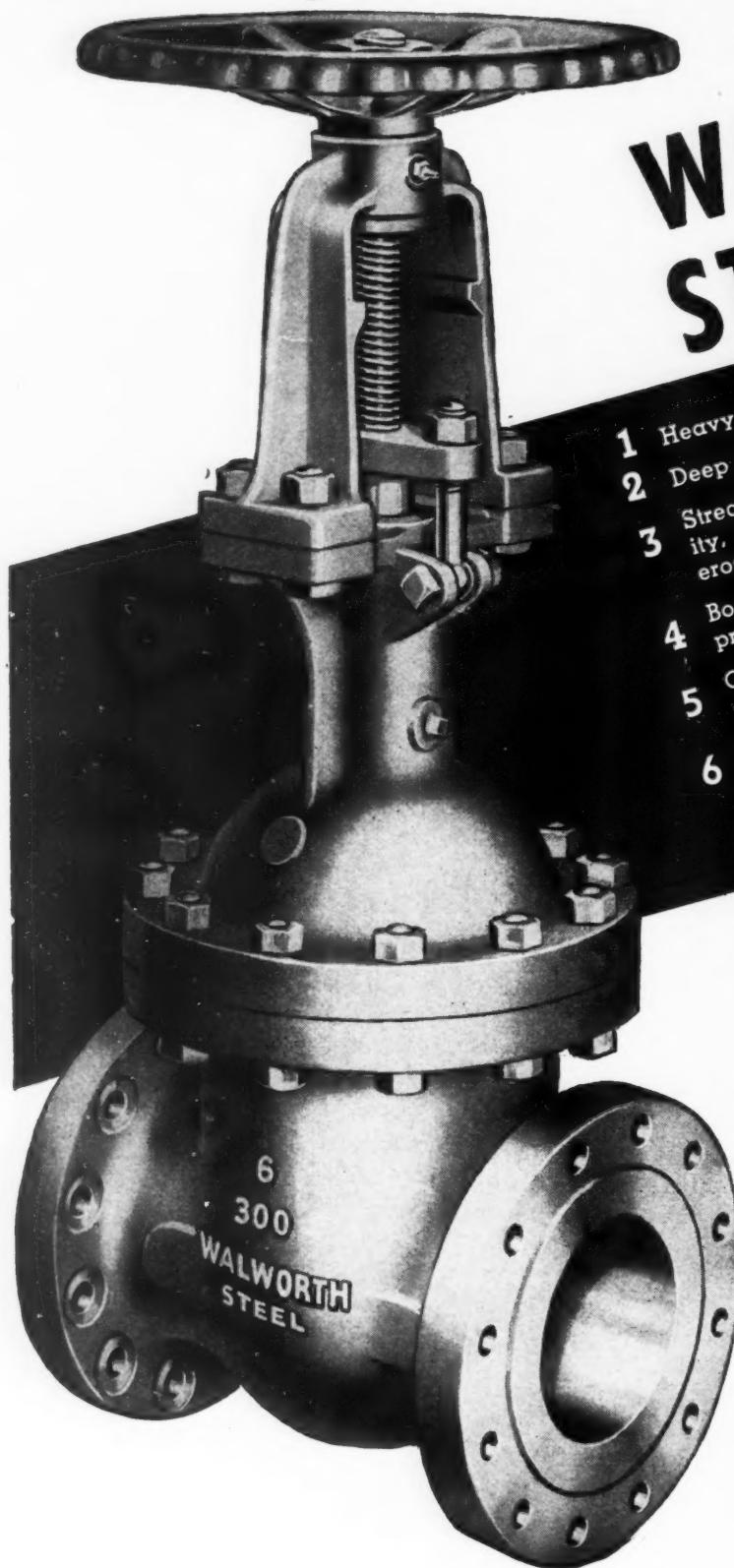
CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

** Ask your Cummins Dealer to show you similar working installations in your own territory.*



You get all these **BIG** features

in
**WALWORTH
STEEL VALVES**



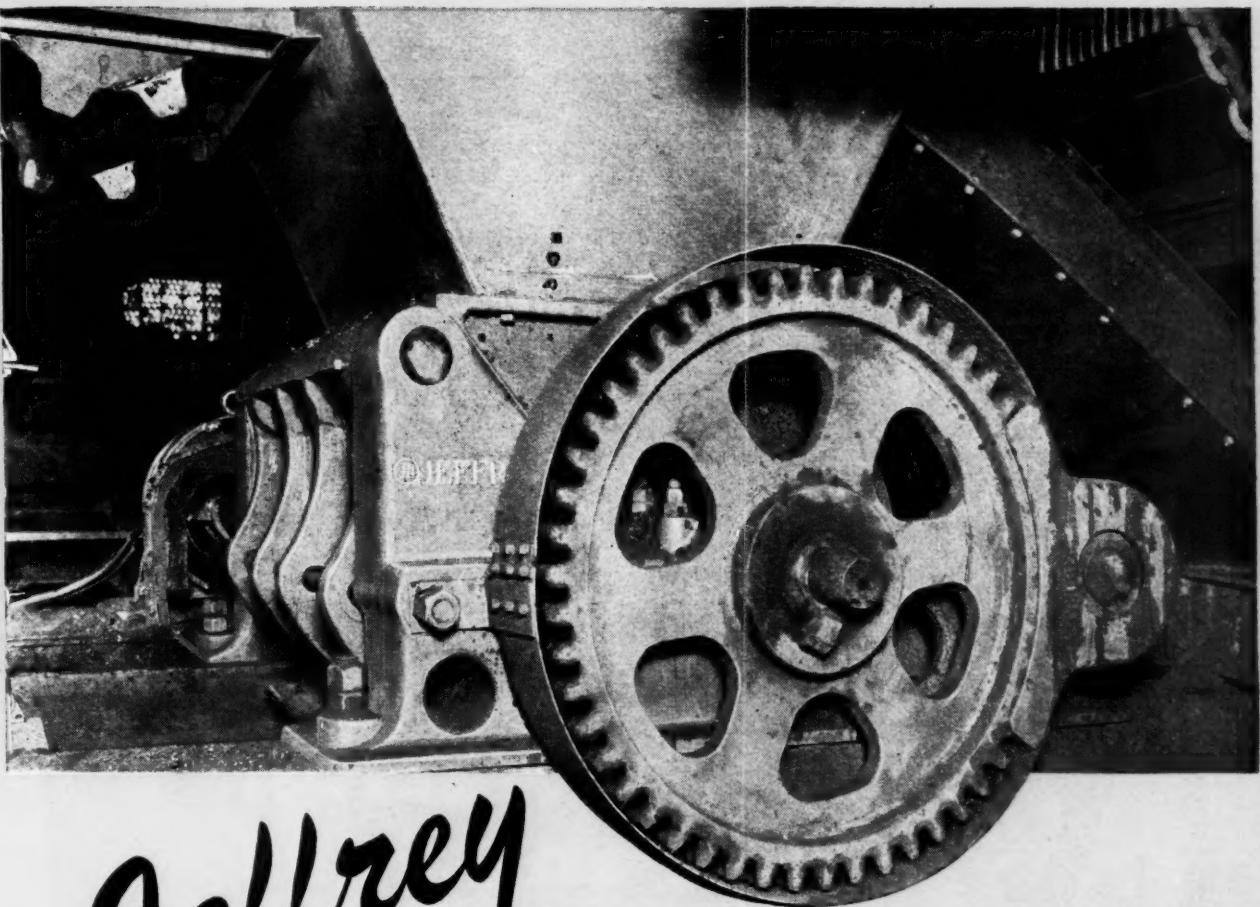
- 1 Heavy steel walls for extra strength and protection.
- 2 Deep stuffing boxes to eliminate costly leaks.
- 3 Streamlined ports to make possible a high velocity, non-turbulent flow, and reduces possible erosion.
- 4 Bodies and bonnets engineered to withstand pressure and minimize distortion.
- 5 Cast body guide rib faces, machined to insure accurate disc centering.
- 6 Exact design, metallurgy and construction of yoke nuts, bonnet bushings, gland followers, handwheels and other vital parts to assure better service for a longer period of time.

Is there any wonder that out in the field, where approval is based on performance under actual operating conditions, industry has put its O.K. on Walworth Steel Valves?

Tough . . . wear resistant . . . dependable, these valves are produced in gate and globe types, in sizes to cover practically every service requirement. They are excellent examples of Walworth leadership . . . leadership that has made the Walworth valves famous throughout the world.

Walworth Catalog 42 gives complete information regarding Steel Valves as well as the full line of Walworth valves and fittings in bronze and iron. Your copy may be obtained upon request. Whenever you need valves — whether steel, bronze or iron — remember Walworth for dependability, economy, and long service life.

WALWORTH
valves and fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.



Jeffrey

SINGLE ROLL CRUSHER



This Jeffrey crusher turns potential loss into actual profit by enabling you to produce wanted sizes when they are in demand.

In one operation, the Jeffrey Single Roll Crusher will reduce down to 1 1/2" stoker size with a minimum of fines.

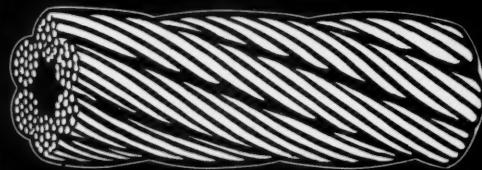
Because Jeffrey engineers know coal production methods thoroughly, understand market trends, they are qualified to recommend the best crushing equipment to fit your individual needs.

**THE JEFFREY
MANUFACTURING COMPANY**
912-99 North Fourth St., Columbus 16, Ohio

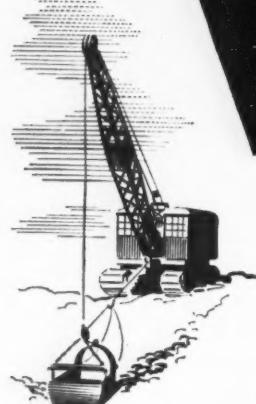
Baltimore 1 Buffalo 2 Cleveland 13 Marion Milwaukee 11 Pittsburgh 22
Birmingham 3 Chicago 1 Denver 2 Houston 5 New York 7 St. Louis 3
Boston 16 Cincinnati 2 Detroit 13 Huntington 19 Philadelphia 3 Salt Lake City 1
Scranton 3



Resists Abrasion Better...



UPSON-WALTON LANG LAY ROPE



U-W Lang Lay (in which, unlike other types of wire rope, the wires and strands are twisted in the *same* direction) offers many advantages to many users.

For dragline excavators . . . shovels . . . slope haulages and inclines; for backfillers, slushers, carryall scrapers, and traction ropes on aerial tramways—wherever there are severe abrasion conditions and wherever exceptionally good flexibility and maximum resistance to bending fatigue are necessary, U-W Lang Lay rope can be counted upon to do the best job.

Lang Lay provides the greatest resistance to abrasion because the outer wires have a much greater wearing surface—*almost three times as much as regular lay!* This, in turn, provides greater metallic bearing which reduces wear on sheaves and drums as well as on the rope itself. It should, however, in almost all cases be *Pre-formed* to prevent untwisting and provide longer service at lower operating cost.

U-W Lang Lay ropes are available with hemp center or IWRC (Independent Wire Rope Center).

For best service where wear is hardest, specify *U-W Lang Lay, Perfection Grade, Layrite Preformed*.



Established 1871

All Upson-Walton Products Available
Through Your Local Upson-Walton Distributor

Copyright 1946—The Upson-Walton Company

THE UPSON-WALTON COMPANY

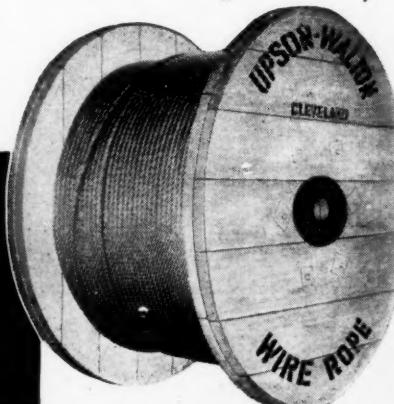
Manufacturers of *Wire Rope, Wire Rope Fittings, Tackle Blocks*

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street
New York 4

737 W. Van Buren Street
Chicago 7

241 Oliver Building
Pittsburgh 22





LONG HAUL OR SHORT...DEPEND ON
RUGGED BWH BELTS!

Long, grinding uphill work is the kind of job that tough BWH Conveyor Belts thrive on. And the operators of this South Carolina quarry...faced with the problem of obtaining a belt that would take just such terrific abuse...naturally turned to BWH.

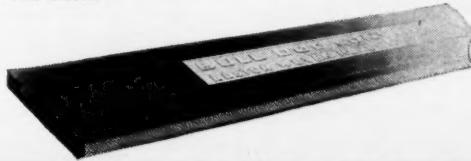
Our engineers solved the problem by this triple Bulldog Conveyor installation. Millions of tons of sharp-edged granite have left the belts in excellent shape...and years of dependable service still lie ahead.

The secret of the enduring strength of these Conveyor Belts is the famous BWH ROTOCURE process, which produces belt-

ing free from press overlaps...uniformly vulcanized and stretched...and with a built-in durability that has meant enviable performance records!

When next you need a conveyor belt, look to BWH for dependable ruggedness...BWH distributors for dependable service!

HAVE YOU A JOB WHERE STAMINA COUNTS?
Bring us your toughest problems...we're specialists in solving them. Consult your nearest BWH distributor, or write direct.

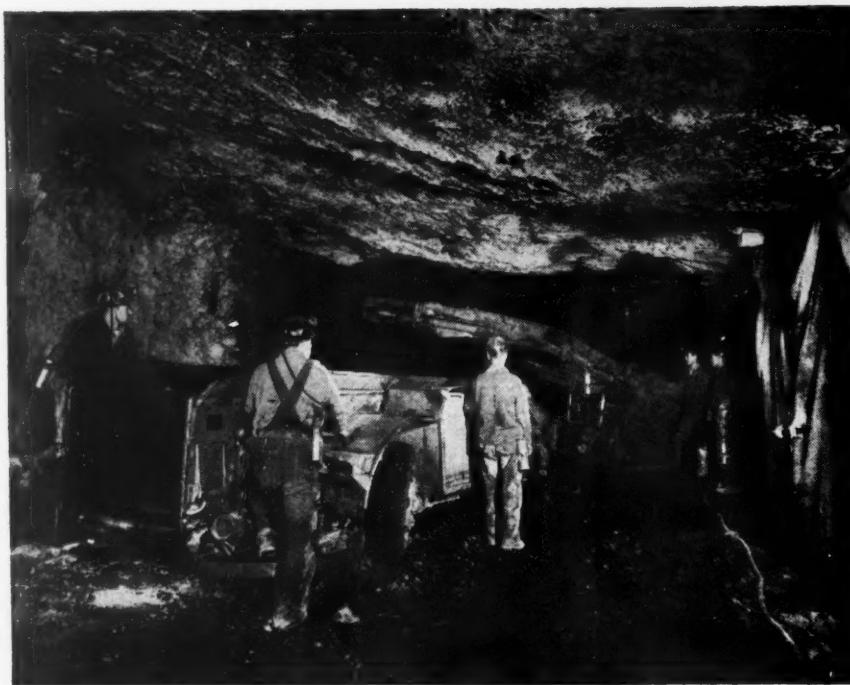


BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

BATTERY-OPERATED *Shuttle Cars* Shorten Gathering Trips...



Courtesy of Engineering & Mining Journal



...ALKALINE BATTERIES *Cut Haulage Costs*

BECAUSE they carry their own power supply, battery-operated shuttle cars can take the shortest practical route between face and loading stations. No time is lost in making or breaking external power connections with battery cars, or in round-about maneuvering to avoid running over cables. Since battery shuttle cars do the job the quickest, shortest way, they can make more hauls per shift at lower operating cost.

With batteries exchanged at the end of each shift, a shuttle car is kept *continuously* supplied with adequate power. While one battery operates the car the other is charged. Not only does the car make efficient use of power but current for charging is the lowest-cost power available. As charging can usually be done on off-peak hours, a substantial

reduction in maximum power demand is effected.

Altogether the superior flexibility, higher availability, and over-all operating and maintenance economy of the battery-operated shuttle car make it an inherently dependable and efficient haulage unit—especially when powered by Edison Alkaline Batteries. With steel cell construction, an alkaline electrolyte that is a preservative of steel, and a fool-proof principle of operation, Edison Batteries are the most durable, the longest-lived and most trouble-free of all batteries offered for haulage services. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.

Edison
ALKALINE BATTERIES

Coal Economy

...is achieved
through the use of
SPECIFIC GRADES



Crucible Fuel Division, Crucible Steel Company of America, Crucible, Pennsylvania, uses two 48" R & S Hydro-Separators, two 7' and one 20' R & S Hydrotators to produce processed coal for metallurgical use at the rate of 400 tons per hour.

Run-of-mine capacity is 500 tons per hour. Raw coal screen-sizing, hand picking and crushing of the plus 4" material proceeds at this rate until 4" material is stored in a 2000 ton concrete bin. Further sizing to 4" x 1" and 1" x 3/8" for the coarse coal washing in R & S Hydro-Separators and 3/8" x 0" for the fine coal washing in R & S Hydrotators, is at the rate of 400 tons per hour. The blended and washed coal is reassembled for shipment in river barges or in railroad cars.

WISE COAL CONSUMERS

use the grade of coal particularly adapted to their specific requirements—

SMART PRODUCERS

clean and grade their coal to fit the specific requirements of their customers—or for their own use.

R & S HYDRO-SEPARATORS

Hydrotators—and Stump Air Flow cleaners are designed for better processing to meet these consumer demands. R & S descriptive bulletins should help you. We will be glad to send them to you upon request. Bulletin No. 161—R & S Tandem Hydro Separator; Bulletin No. 162—R & S Hydrotator; Bulletin No. 163—R & S Stump Air-Flow Cleaner.



ROBERTS and SCHAEFER CO.

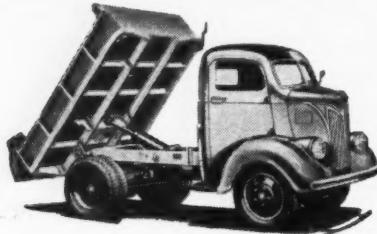
307 North Michigan Avenue, Chicago 1

P. O. Box 865
PITTSBURGH, PA.

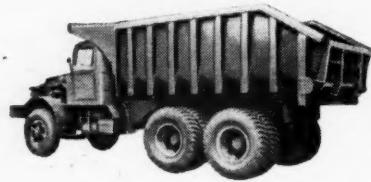
P. O. Box 570
HUNTINGTON, W. VA.

THE BEST COSTS LESS

For years Gar Wood has consistently offered truck and trailer equipment of utmost utility and outstanding value. Leadership in this field resulted from this policy. Gar Wood equipment costs less in the long run because it is better built to give peak performance and lasting satisfaction.



Type C12 Body and Model D6 or D7 Hoist. Dumping angle 55°.



Type X-112 Extra heavy duty Body with automatic downfolding tailgate.



Special rock Body, scoop type rear end. Model F4CA cam and roller Hoist.



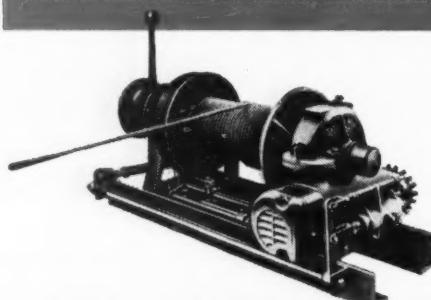
Type W12 Body. Model F4C cam and roller Hoist. Capacity 6 cu. yds.



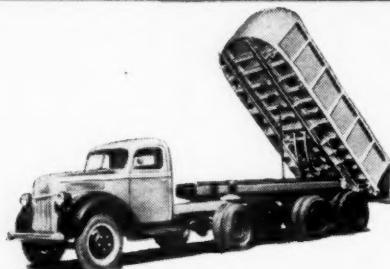
Type X-112 Extra heavy duty Body, scoop end, with Model T-4440 Hoist. Capacity 19 cu. yds.



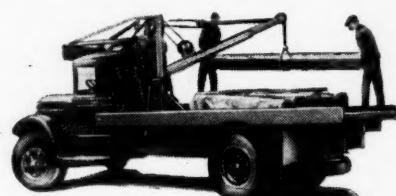
Type W12 Body, front recessed for Model TV83 Hoist. Capacity 15 cu. yds.



Rapid Reverse truck Winch. Single lever control. Capacities 15,000 to 60,000 pounds line pull.



West Coast Special W-12 Body, Model F8C cam and roller Hoist. Capacity 10 cu. yds.



Telescopic boom Crane. Radius 8 to 20 feet.



GAR WOOD INDUSTRIES INC.

7924 RIOPELLE ST.

DETROIT 11, MICH.

WORLD'S LARGEST MANUFACTURERS OF TRUCK AND TRAILER EQUIPMENT
OTHER PRODUCTS: TRUCK TANKS ROAD MACHINERY HEATING EQUIPMENT MOTOR BOATS

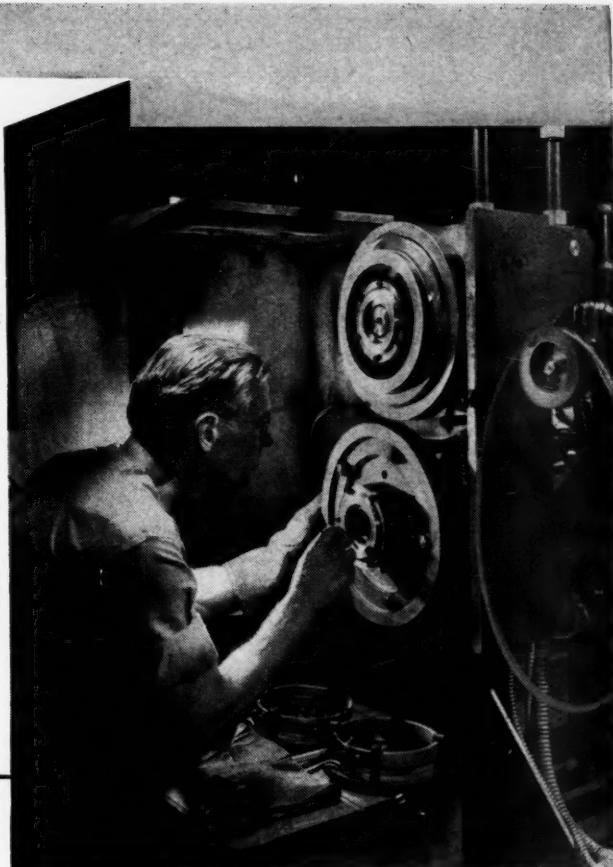
Prolong the life of your ball
and roller bearings with
these quality Gulf greases:

Gulf Anti-Friction Grease

FOR MODERATE AND HEAVY DUTY SERVICE

Gulf Precision Grease

FOR LIGHTER DUTY AND HIGHER SPEEDS



This machine, developed by Gulf technologists to evaluate the useful life of greases in lubricating ball and roller bearings, furnishes additional evidence of better lubrication with Gulf Anti-Friction Grease and Gulf Precision Grease.

BOOTH laboratory tests and maintenance records in hundreds of plants prove that Gulf Anti-Friction Greases and Gulf Precision Greases are superior lubricants for anti-friction bearings. They have greater stability, a high melting point, maximum resistance to separation, and show minimum change in consistency in service.

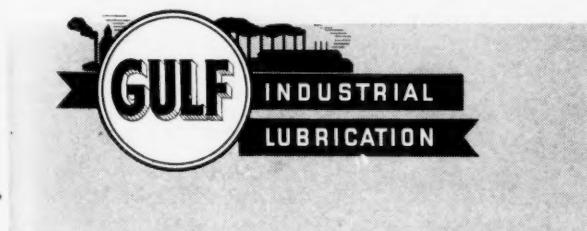
Gulf-developed methods of compounding, employing special high-pressure kettles and mixing

methods, produce these greases with a relatively smooth, nonfibrous texture.

Both of these superior anti-friction bearing lubricants are available in a broad range of N.L.G.I. consistencies. Call in a Gulf Lubrication Service Engineer today and ask him to recommend the proper type and grade for your every requirement. Or send the coupon below for further information.

Gulf Oil Corporation • Gulf Refining Company

Division Sales Offices: Boston • New York • Philadelphia • Pittsburgh • Atlanta • New Orleans • Houston • Louisville • Toledo



Gulf Oil Corporation • Gulf Refining Company
3800 Gulf Building, Pittsburgh 30, Pa.

CA

Please send me, without obligation, complete information on Gulf Anti-Friction Grease and Gulf Precision Grease.

Name.

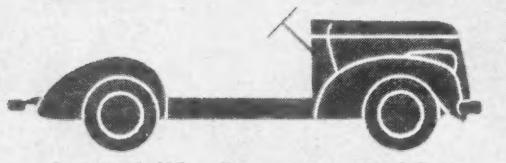
Company.

Title.

Address.



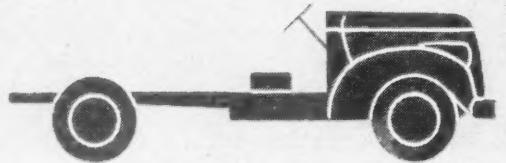
116-inch Wheelbase—One Model



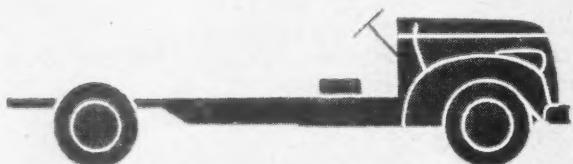
115-inch Wheelbase—Ten Models



125 1/4-inch Wheelbase—Nine Models



134 1/2-inch Wheelbase—Thirty-four Models



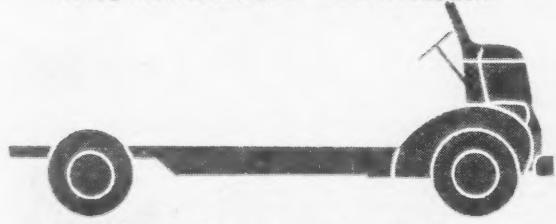
160-inch Wheelbase—Thirty-one Models



109-inch Wheelbase—Four Models



132 1/2-inch Wheelbase—Seven Models



158-inch Wheelbase—Two Models

WHATEVER
YOUR BUSINESS
THERE'S A
CHEVROLET
TRUCK
TO FIT YOUR
HAULING
NEEDS

99 MODELS

9 WHEELBASES

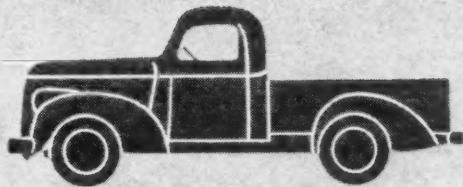
195-inch Wheelbase—One Model (School Bus)



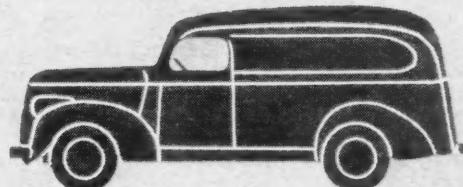
The only business that can't profitably use a Chevrolet truck is a business that needs no truck at all—for Chevrolet's expanded line, which now comprises 99 models on nine wheelbases, ranges from the beautifully styled Sedan Delivery to ruggedly massive models in the heavy-duty class. Newly added to the truck line are heavy-duty models of increased load capacity. . . . Among Chevrolet's 99 models on nine wheelbases—some with the standard Thrift-Master engine, some with the high-torque Load-Master engine—there is a truck to fit your requirements. . . . Whether you use a standard type of body, a special-purpose body, or specialized mechanical equipment, there is a Chevrolet to serve your needs and save you money.

CHEVROLET MOTOR DIVISION
General Motors Corporation
DETROIT 2, MICHIGAN

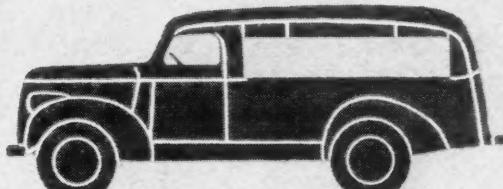
SEE YOUR CHEVROLET DEALER
HE CAN SUPPLY SPECIAL BODIES AND
EQUIPMENT FOR ANY HAULING JOB



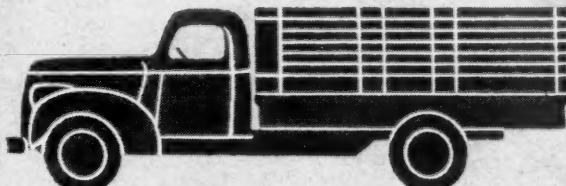
Pick-up—Four Models on Three Wheelbases



Panel—Five Models on Four Wheelbases



**Canopy Express—Three Models
on Two Wheelbases**



Stake—Fourteen Models on Five Wheelbases



High Rack—Four Models on Two Wheelbases

CHEVROLET TRUCKS



PICK-UPS



PANELS



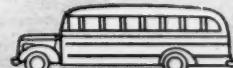
STAKES



CAB-OVER-ENGINE



TRACTOR-TRUCKS AND CHASSIS FOR SPECIAL EQUIPMENT



99 MODELS • 9 WHEELBASES • THE RIGHT TRUCKS FOR ALL TRADES

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

MAKES YOUR MODERN
MECHANIZED EQUIPMENT
pay bigger dividends



CARDOX
HARDSOCG DRILLING
EQUIPMENT

Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

• CARDOX increases the efficiency of mechanized equipment in many ways. It makes possible the use of longer cutter-bars. It rolls out the coal for faster, easier loading...with less wear on mechanical loaders. Its gentle heaving action produces more coarse sizes...which are more eco-

nomical to clean. CARDOX-mined coal will not crumble when subjected to extensive mechanical handling. It is firm and remarkably free from shatter-cracks.

Write for full details on free demonstration of CARDOX under your current working conditions.

CARDOX CORPORATION • Bell Building • Chicago 1, Ill.



Shock Loads **WON'T BRUISE**
OUT THIS HEAVY-DUTY ROCK HAULER

Designed for heavy-duty rock hauling, the Dumptor can take its 6-yard capacity load in one chunk — and like it! No wonder then that it stays on the job longer, does the everyday tasks with less time out for overhauling. Strong steel channels reinforce the gravity dump body. 18:00 x 20 drive wheel tires cushion rock shocks. Alloy steel drive axles are heat strengthened. Oscillating front axles, heavily sprung, take the twists out of haul road travel. Heavy frame is well braced. Cast steel housings protect rear axle and transmission.

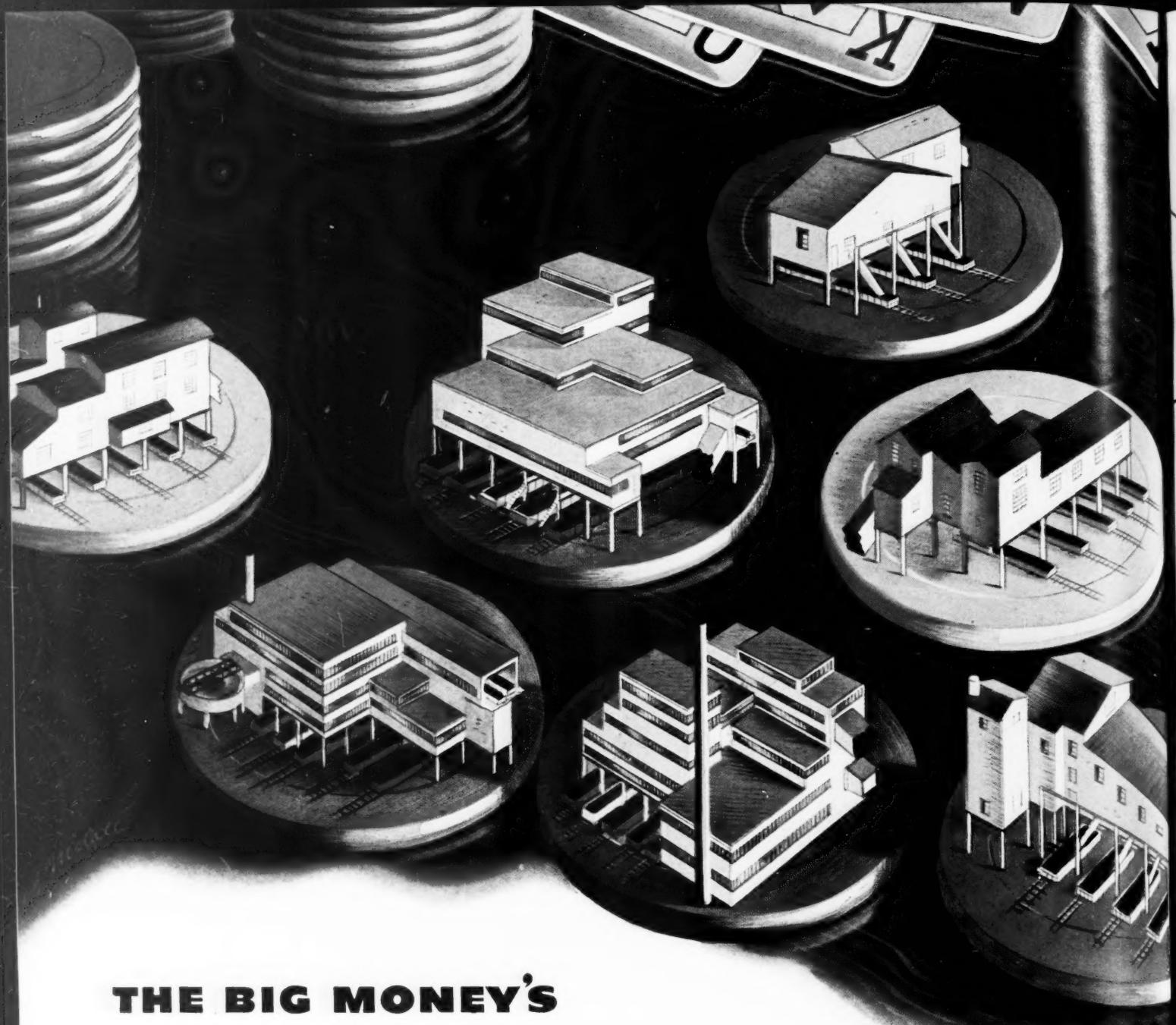


ASK FOR YOUR DUMPTOR
CATALOG TODAY

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN



HEAVY-DUTY CONSTRUCTION EQUIPMENT



THE BIG MONEY'S IN THE *BLUE CHIPS* . . .

Certain coal preparation plants are "blue chip" operators. They are in the big money when gross sales and profits are charted. They continue to pay dividends regularly.

Red and white chip operators are in there pitching, too. But the "blue chip" plants, with their automatic cleaning equipment, stoker coal preparation and drying, are able to turn out more tons of specification fuel with a minimum crew.

Customer specifications can be met easily in the

"blue chip" plants because a wide range of sizes from large lump to stoker coal can be produced automatically in a smooth-working production line operation.

To coal mines without these facilities a technical staff is at your service with a background of over a quarter-century of experience in the erection of profit-making plants. This staff knows your problems . . . has the ability to forecast ultimate preparation plant performance based on thorough, expert laboratory analyses of your raw coal. This staff is available for consultation . . . anywhere in the world.

M'NALLY & PITTSBURG

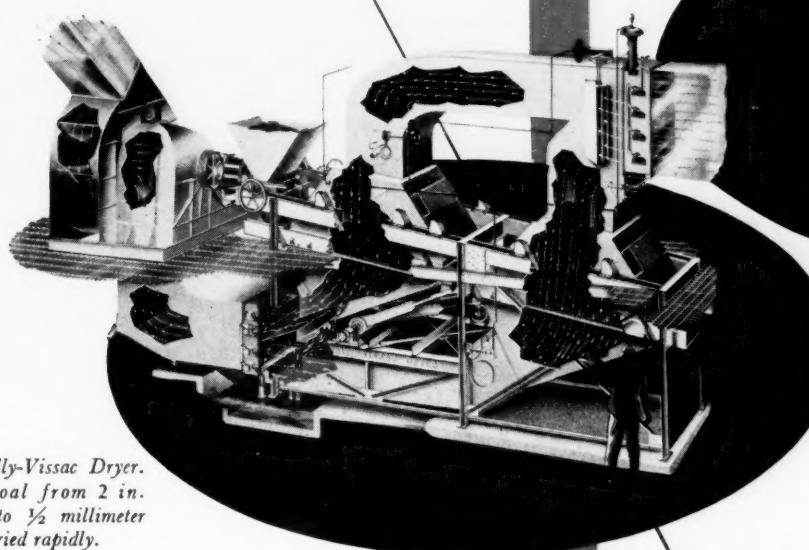
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

HUGE PRODUCTION

FROM THESE

BLUE CHIP
PERFORMERS

McNally-Vissac Dryer.
Wet coal from 2 in.
down to $\frac{1}{2}$ millimeter
sizes dried rapidly.



At the turn of an electric switch on the control panel in a McNally Pittsburg coal preparation plant, coal starts to move automatically from raw coal feed through various crushing, screening, washing, drying operations to the loading booms which discharge specification fuel into waiting freight cars.

Plants of any capacity from a few tons per hour to 2000 tons per hour or more can be erected to meet each operator's needs, based on the raw coal and mar-

ket requirements for fuel to specifications.

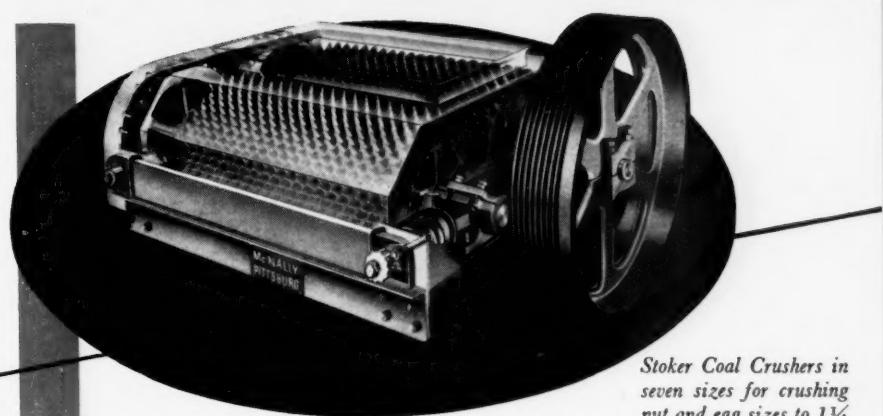
McNally crushers reduce coal to the sizes acceptable for various classifying screens. McNally-Norton washers remove noncombustible material and produce fuel according to predetermined specifications. McNally-Vissac Dryers dry the washed product rapidly and without degradation. The entire plant is a smooth operating unit fully up to the expectations of the plant superintendent's fondest dreams.

M'C NALLY & PITTSBURG

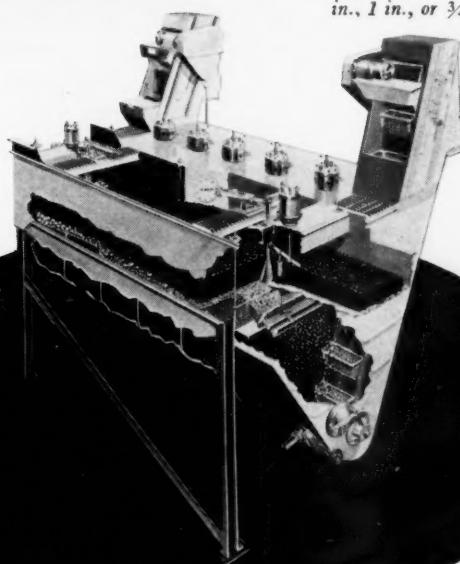
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans.
Morrow Manufacturing Co., Subsidiary, Wellston, Ohio.

Engineering & Sales Offices: Chicago (1), Ill.; Pittsburgh (22), Penna.;
Columbus, Ohio; Wellston, Ohio; Caixa Postal 1310, Rio de Janeiro, Brazil.



Stoker Coal Crushers in
seven sizes for crushing
nut and egg sizes to $1\frac{1}{4}$
in., 1 in., or $\frac{3}{4}$ in.



McNally-Norton Washers for clean-cut separa-
tion of coal from non-
combustible refuse.

Cut Service Costs With **INTERNATIONAL TRUCK EXCHANGE UNITS**

Clutches • Brake Shoes • Crankshafts



• These and many other International Truck Exchange Units are reconditioned by factory methods so expertly that they are practically the same as new.

They cost less, but deliver new unit service.

They save time. The old unit is removed. The Exchange Unit is installed.

They are available from International Branches and International Dealers everywhere—installed by International-trained

shop mechanics. Ask for International Truck Exchange Units.

**Also available from your International
Truck Branch or Dealer**

- Factory-Standard International Parts • Tachometers • Battery and Spark Plug Cable Sets • Trailer Coupling-Cable Kits • Seat Covers • Saf-T-Step • SOS Fire Guard • Whiz Automotive Chemicals • Spot Lights, Fog Lights and Driving Lights • Clearance Lights, Flags, Flares, Directional Signals and other Safety Devices.

Motor Truck Division

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

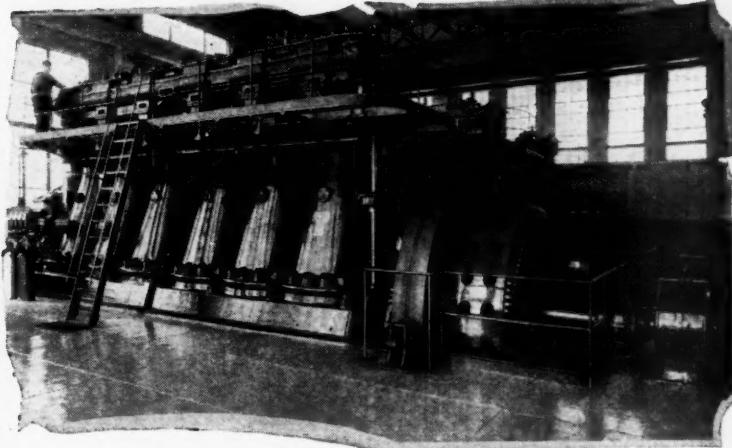
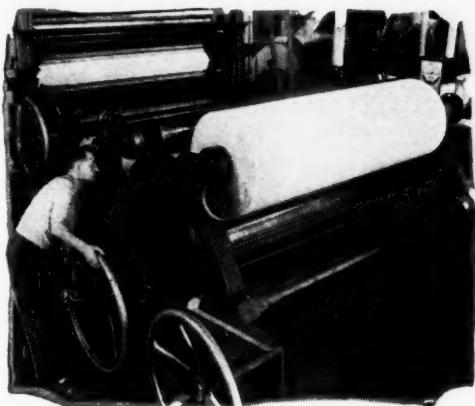
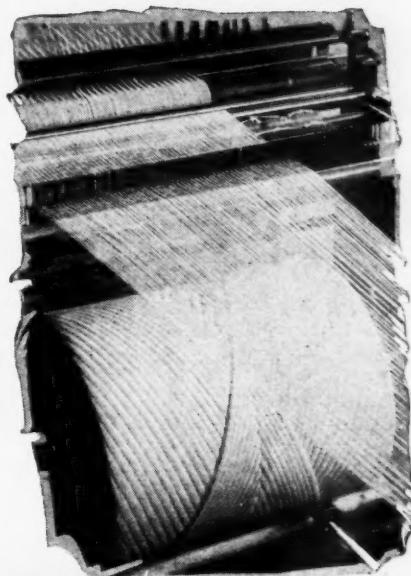


Tune in "Harvest of Stars" Sunday, 2 p.m. Eastern Daylight Time. NBC Network



INTERNATIONAL Trucks

*"Lowest
Repair Bills
in History"*



... SINCE SWITCHING TO

Tycol ENGINEERED LUBRICATION

"No sticking valves . . . negligible cylinder wear — with Tycol DIESEL OILS."

"Absence of sludge and corrosion . . . no wear on bearings — with Tycol RIO TURBINE OILS."

"Superior performance under high-temperature service — with Tycol STEAM CYLINDER OIL."

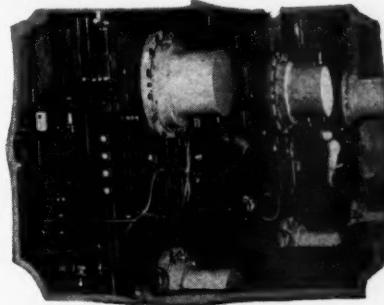
"Complete rust protection . . . corrosion eliminated — with Tycol NO-RUST-OLS."

"Maintenance costs cut 20% . . . since using Tycol E.P. Lubes."

That's how engineers and operating men express their satisfaction with the Tycol Industrial Oils and Greases they are using.

There's a Tycol oil and grease for every industrial need. For complete data on the Tycol lubricant best suited for your needs, get in touch with your nearest Tide Water Associated office today.

LUBRICATION—"ENGINEERED TO FIT THE JOB"



Boston • Charlotte, N. C.
Pittsburgh • Philadelphia



A BETTER TWO-PURPOSE MINING for COAL and ROCK DRILLING

The NEW

Thor

**No. 33 SINKER
ROCK DRILL**

*Now, a Lightweight Drill that provides
Greater Rotative Power, Handling Ease and Safety*

Tested, approved and purchased by over 90 mines, this new light-weight Thor Rock Drill brings unequalled advantages in safety, efficiency and economy. Air operated, it provides added ventilation at the face and a special exhaust to reduce dust disturbance and explosion hazards. With an accurately gauged impact, it is designed to drill top and bottom rock, as well as coal,

at economical drilling speeds with conventional Hollow steels or Auger steels.

Compact and sturdy for easy one-man operation, the Thor No. 33 Rock Drill is built from only the finest materials to assure long life and economical maintenance. For a demonstration call your nearest Thor branch office.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois

Birmingham	Boston	Buffalo	Cleveland	Detroit	Los Angeles	Milwaukee	New York	Philadelphia
Pittsburgh		St. Louis		Salt Lake City		San Francisco	Toronto, Canada	London, England



THOR NO. 139 AUGER

The Thor No. 139 Auger Drill, with *additional* characteristics that provide *down-stroke* rotation, is recommended for drilling in formations that require less impact for *rapid* augering. This condition usually exists in formations more easily penetrated. Varied rotation speeds are available in the No. 139 to meet any ground conditions for maximum augering efficiency. Weight, 39 pounds. Dry or wet types, as specified, to take $\frac{7}{8}$ " hexagon or quarter-octagon collared steels.

THOR NO. 28 SINKER

Thor's new No. 28 "featherweight" rock drill is by far the fastest hitting tool in its class. Weight, 30 pounds; length, only $18\frac{1}{2}$ inches. Where a fast, light hitting tool is desirable, the "28" packs unusually powerful rotation for tools in its weight class. In fifty anthracite mines it has *already proved* highly effective with auger steels.

TOOL

Dry or Wet

•

½" Hex. or Q.O.
collared steels



NEW LIGHTWEIGHT

Weighs 39 pounds as pictured—with "D" type handle, forged steel retainer and feet for sliding on planks . . . all standard.

NEW GAUGED IMPACT

The impact is gauged not to break auger steels—at the same time it maintains reasonable drilling speeds in top and bottom rock and in bony coal.

NEW POWERFUL ROTATION

Very high torque is developed by this machine to maintain positive rotation in the hardest going with auger steels. Outstanding performance for a tool that weighs only 39 lbs.

SIDE EXHAUST

Deflects exhaust air from operator and drilling face to reduce dust hazard.

OFFSET HANDLE

Permits full grip for plank-mounted operation.

EASY-SLIDE LUGS

Retain steel alignment when drill is laid on a plank and slid along as drilling progresses.

Thor
PORTABLE POWER
TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

COAL in this Newspaper?



WE'LL grant you that paper is white and coal isn't. But because steam and power are big factors in making paper, the paper industry uses about *twelve million tons* of coal every year.

In addition to that, the printing and publishing business uses about *twenty million tons* of coal annually. So, when you stop to think about it, there is coal in your newspaper, just as there is coal in nearly everything else. Practically every product manufactured is made with the help of coal.

Over *one hundred million tons* of coal are used each year to heat the homes of America. More than *a quarter of a billion tons* of coal are used annually by American industry. The big steam stations of the great electric service companies consume about *sixty million tons* more.

Almost everybody knows, too, that coal as a raw material is a treasure house. From coal and coal derivatives, chemical genius today turns out better, cheaper plastics, textiles, drugs, perfumes, road materials,

building materials, oils, chemicals, paints, adhesives, insulators, binders, waterproofing agents, detergents. So coal marches on into new fields, new markets.

The railroad industry uses more than *one hundred million tons* of coal each year. Chesapeake and Ohio believes in the efficiency and economy of coal for hauling both freight and passenger trains. When you ship via Chesapeake and Ohio, you know your coal is being hauled exclusively by coal burning locomotives.

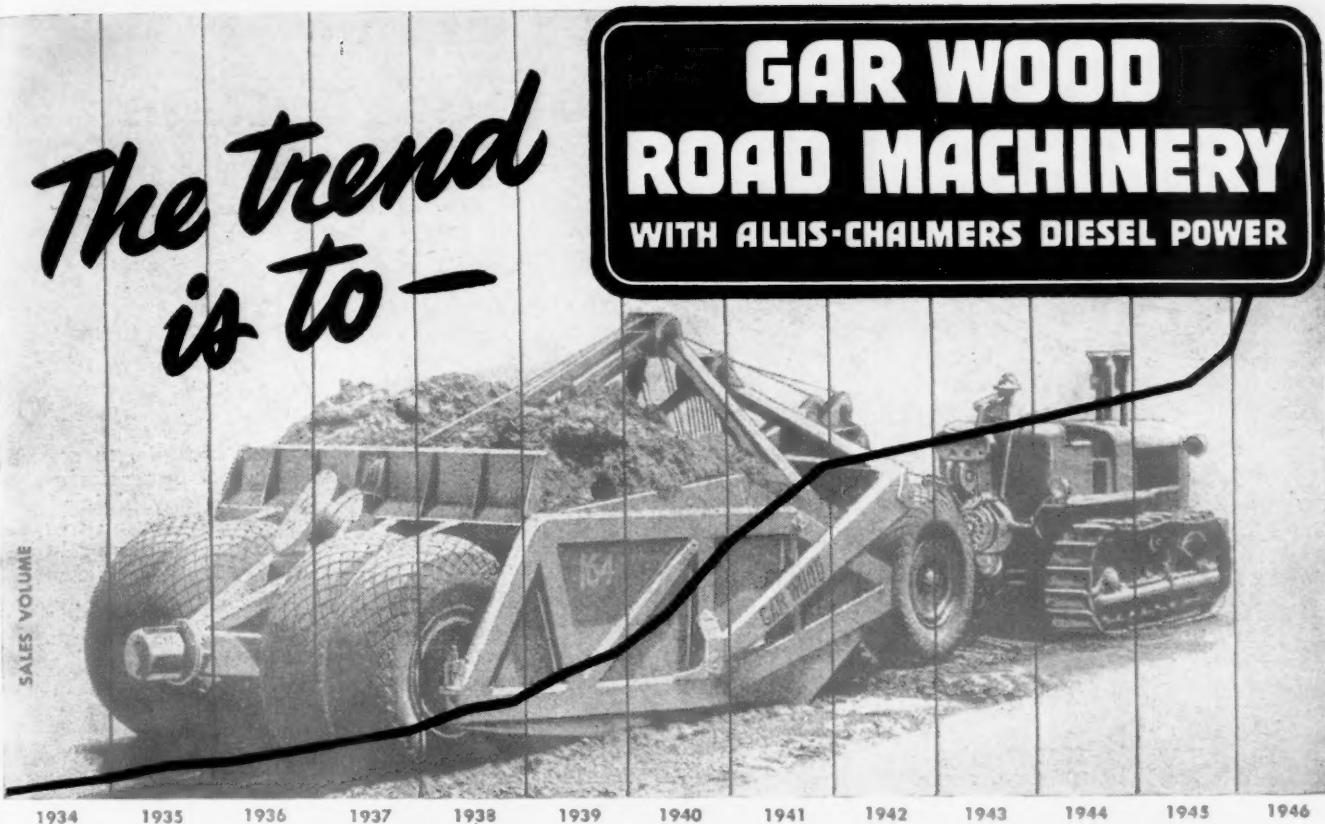
THE CHESAPEAKE AND OHIO RAILWAY

"The 100% Coal Railroad"

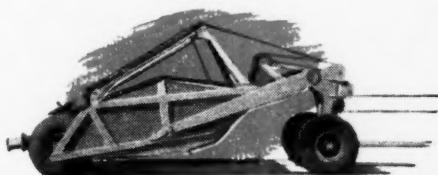
*The trend
is to -*

**GAR WOOD
ROAD MACHINERY
WITH ALLIS-CHALMERS DIESEL POWER**

SALES VOLUME



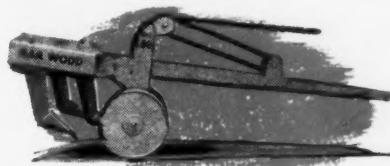
1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946



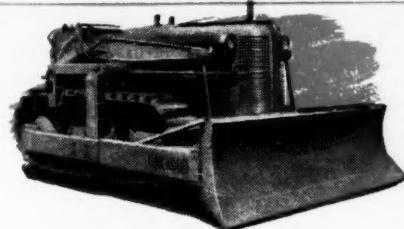
4-WHEEL CABLE SCRAPERS
Capacities: 11-15-20-25 cu. yds.



On every kind of earth moving job, throughout the world, Gar Wood Road Machinery has made good, setting new high standards of performance and workmanship.

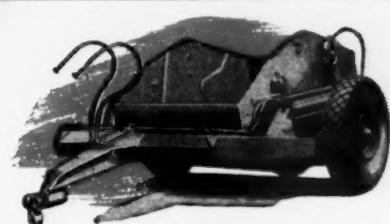


HEAVY DUTY RIPPERS
Cable and hydraulically operated

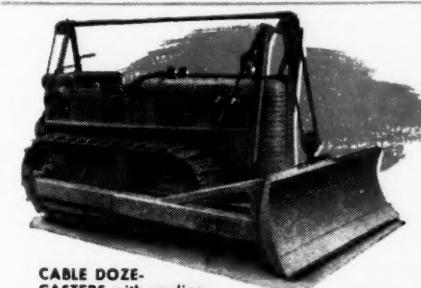


HYDRAULIC DOZECASTERS with angling blades, for all Allis-Chalmers Tractors

As a result, the demand for this equipment has steadily grown over a period of many years (see chart above) until now it has reached the proportions of a world-wide trend.

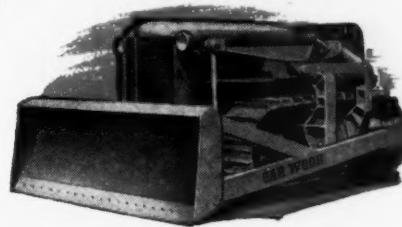


2-WHEEL HYDRAULIC SCRAPERS
Capacities: 3-5-6-8 cu. yds.



CABLE DOZE-
CASTERS with angling
blades, for Allis-Chalmers HD-10, HD-14 and
HD-14C Tractors

Here is a sound reason for specifying Gar Wood earth moving units. "Nothing succeeds like success."



HYDRAULIC BULLDOZERS with fixed blades,
for all Allis-Chalmers Tractors.

Contact your Allis-Chalmers dealer. Let him point out the superior features of Gar Wood Road Machinery and show you actual job performance in your territory with many satisfied users.

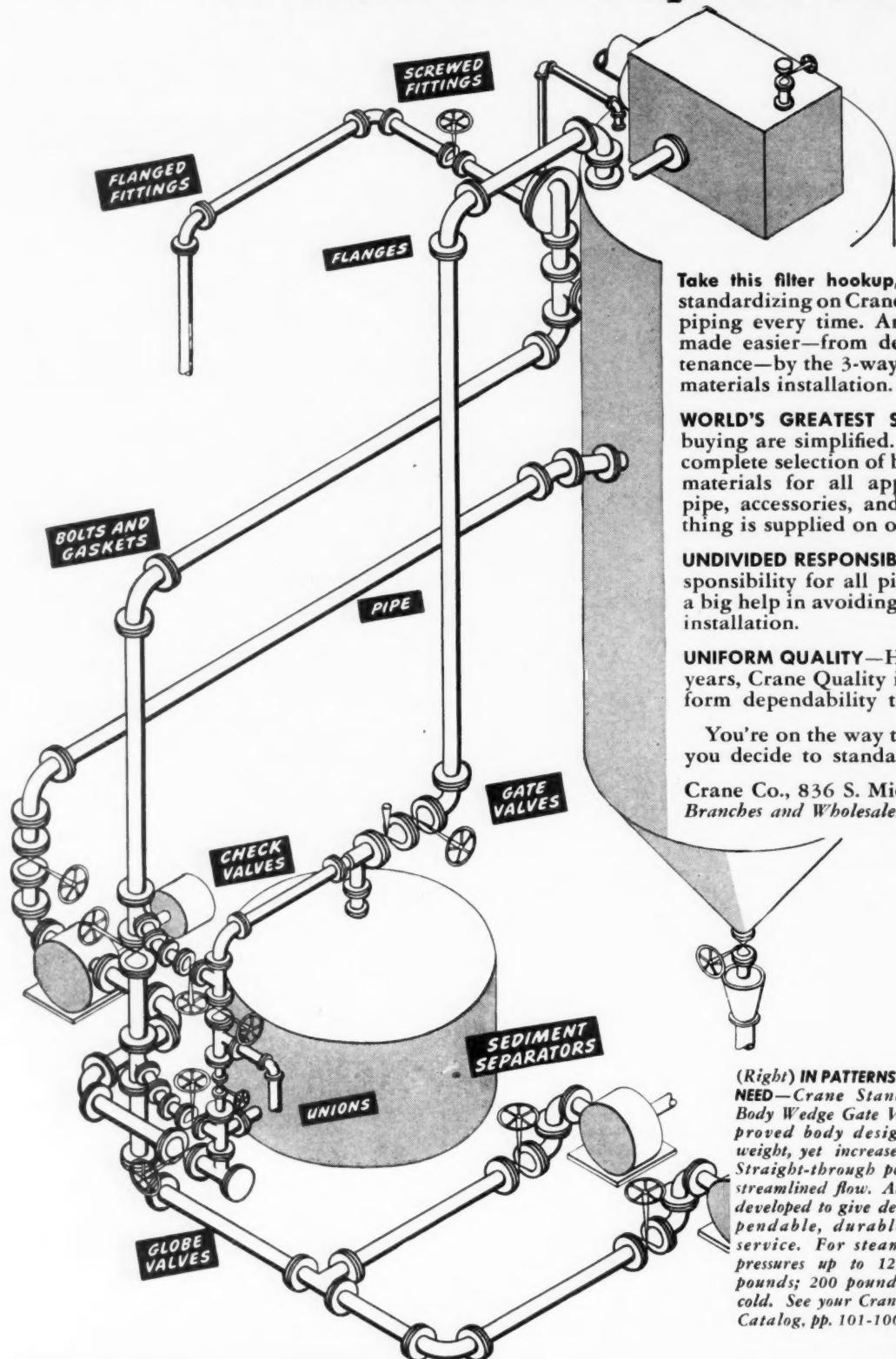


GW ROAD MACHINERY
is Sold Through
ALLIS-CHALMERS
Dealers, Everywhere.

GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE: HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

The **ONE** way to better piping ...with a 3-way advantage



ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

Take this filter hookup, for example, to see how standardizing on Crane equipment results in better piping every time. And how any piping job is made easier—from design to erection to maintenance—by the 3-way advantage of an all-Crane materials installation.

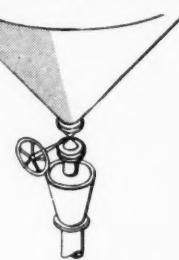
WORLD'S GREATEST SELECTION—Specifying and buying are simplified. You choose from the most complete selection of brass, iron, and steel piping materials for all applications. Valves, fittings, pipe, accessories, and fabricated piping—everything is supplied on one order to Crane.

UNDIVIDED RESPONSIBILITY—You put complete responsibility for all piping materials on Crane—a big help in avoiding delays and getting the best installation.

UNIFORM QUALITY—Highly respected through 90 years, Crane Quality in all materials assures uniform dependability throughout piping systems.

You're on the way to better piping the moment you decide to standardize on Crane equipment.

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



(Right) **IN PATTERNS FOR EVERY NEED**—Crane Standard Iron Body Wedge Gate Valves. Improved body design reduces weight, yet increases strength. Straight-through ports assure streamlined flow. All parts developed to give dependable, durable service. For steam pressures up to 125 pounds; 200 pounds cold. See your Crane Catalog, pp. 101-106.



EVERYTHING FROM ...

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

For
**FREE-ROLLING
FLOTATION . . .**

COOKE
Firestone
EARTHMOVER

OUTSTANDING ability of Firestone Earthmovers to furnish maximum flotation for capacity loads is recognized by earthmoving contractors the world over. Designed for free-rolling wheels of scrapers, tractor and trailer wagons and buggies, the low pressure Earthmover with its large cross sectional diameter rolls easily over sand, loose fill and gumbo. The extra tough, cut-resistant tread design keeps heavily loaded units from side-slipping or skidding on side hill hauling. The tire body, made of heaviest, strongest rayon has *four extra tread plies* to cushion impact blows which cause failure in less rugged tires. Double thick sidewalls protect against rutwear and snagging. *Firestone Earthmover tires, working for you on your equipment, will cut your operating time—and costs—to the minimum.*

Listen to the "Voice of Firestone" every Monday evening

GROUND GRIP

Designed to transmit greatest possible traction to drive wheels of earthmoving equipment, this tire outpulls, outdrives, any tire ever made.

**ROCK GRIP
EXCAVATOR**

Combines great stamina and extra traction in toughest trucking operations, quarrying, logging, construction work, ore and coal strip mining.

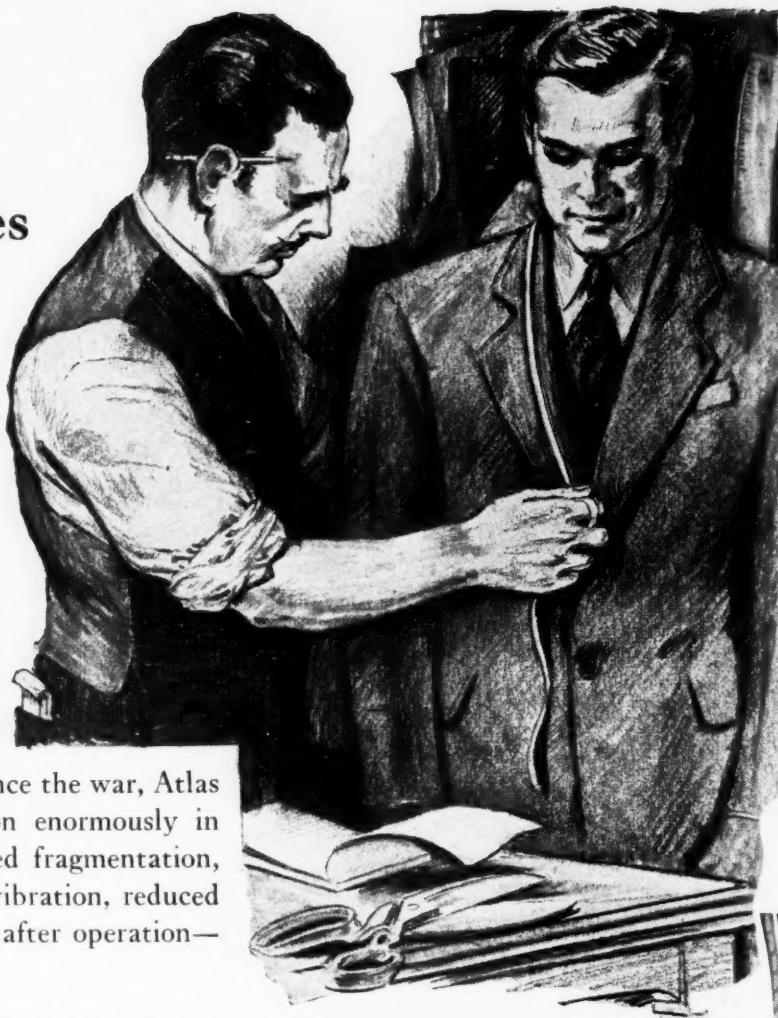
Firestone OFF-THE-HIGHWAY TIRES

Copyright, 1946, The Firestone Tire & Rubber Co.

Fits the Job Like
Custom-Made Clothes

ATLAS
ROCKMASTER

a whole new
System of Blasting



The first major blasting development since the war, Atlas Rockmaster has stepped up production enormously in hundreds of operations. It has increased fragmentation, cut down complaints about noise and vibration, reduced the problem of backbreak in operation after operation—quarrying, mining, construction.

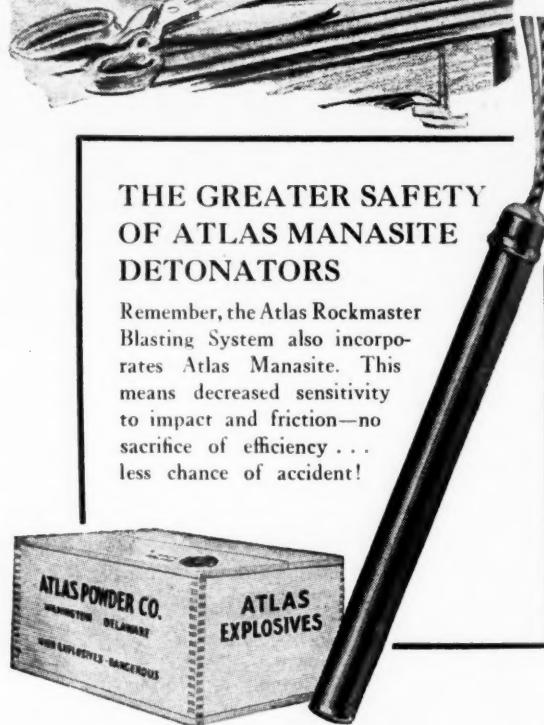
Why? Because Atlas Rockmaster is a blasting system—not just a device—and it's "made-to-measure" for each particular job. Based on an entirely new development of the delayed-action principle, it takes into account drilling, type of explosive, and timing of detonation. Each of these factors must be right for each job. In short, a Rockmaster blast is custom-made to fit requirements.

Not the least factor in Rockmaster's success is Atlas experience with explosives. This "know-how" is yours for the asking *now* in determining what Rockmaster can do for you. Will it cut down your costs, increase your production, as it has for so many others? With your knowledge of the job, and our knowledge of explosives, the answer is probably yes. In any case, we can soon find out. Call in the Atlas Representative!

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

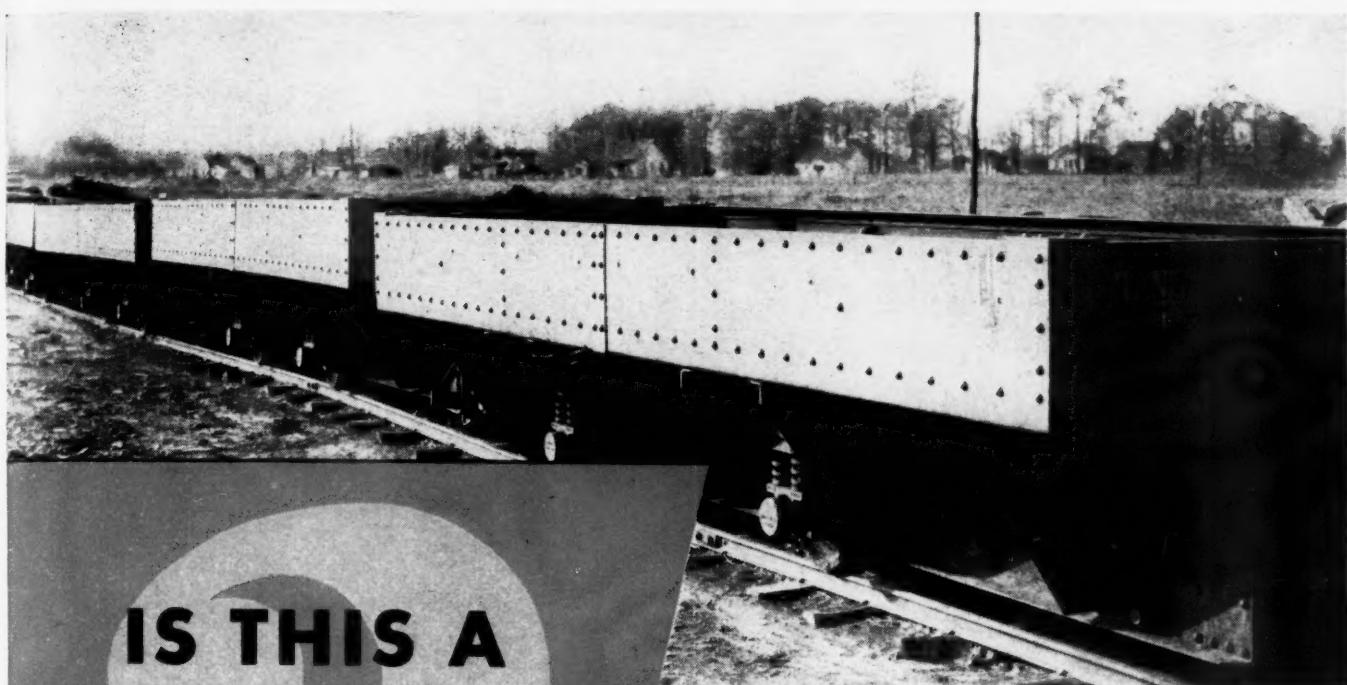
**THE GREATER SAFETY
OF ATLAS MANASITE
DETONATORS**

Remember, the Atlas Rockmaster Blasting System also incorporates Atlas Manasite. This means decreased sensitivity to impact and friction—no sacrifice of efficiency... less chance of accident!



ATLAS EXPLOSIVES
"Everything for Blasting"

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco



IS THIS A MINE CAR HAULING RECORD



Some of the 12, 14-ton, Timken Bearing Equipped mine cars at Buckhorn Mine, Consolidated Coal Co., of St. Louis.



Buckhorn Mine, Consolidated Coal Co., of St. Louis. *

We think it is, but you can formulate your own opinion after reading the facts.

Eight years ago the Consolidated Coal Company of St. Louis placed in operation at the Buckhorn Mine, 12 new all-steel Timken Bearing Equipped mine cars of 14-ton capacity built by Sanford-Day Iron Works, Inc., Knoxville, Tennessee.

Since these cars went into service, the mine operator estimates that approximately five million tons of coal have been mined at Buckhorn. All of this coal has been hauled with the 12 cars; this figures out at more than 400,000 tons per car.

The service given by these cars to date has been thoroughly satisfactory and there is no record of any Timken Bearing ever having been replaced.

More than 1,000 mine operators are getting this kind of service from Timken Bearing Equipped cars. Are you one of them? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADEMARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



WARNING: When buying Timken Bearings for original equipment or replacement, look for the trade-mark "TIMKEN" on every bearing.



For longer oil life in loader gear cases and hydraulic systems



Oil deterioration and deposits—oil oxidation—are caused primarily by heat and agitation of the oil. In loader gear cases, oil oxidation is the principal cause of excessive wear.

Improved Stanoils are fortified to resist oil oxidation by a special inhibitor developed by Standard Oil. In addition, an effective defoaming agent has been added to Stanoil which prevents excessive oil foaming, which is often the cause of erratic hydraulic system operation.

Because Stanoils are available in a wide range of grades you can get these wear-reducing, oil saving advantages on all types of oil lubricated loaders.

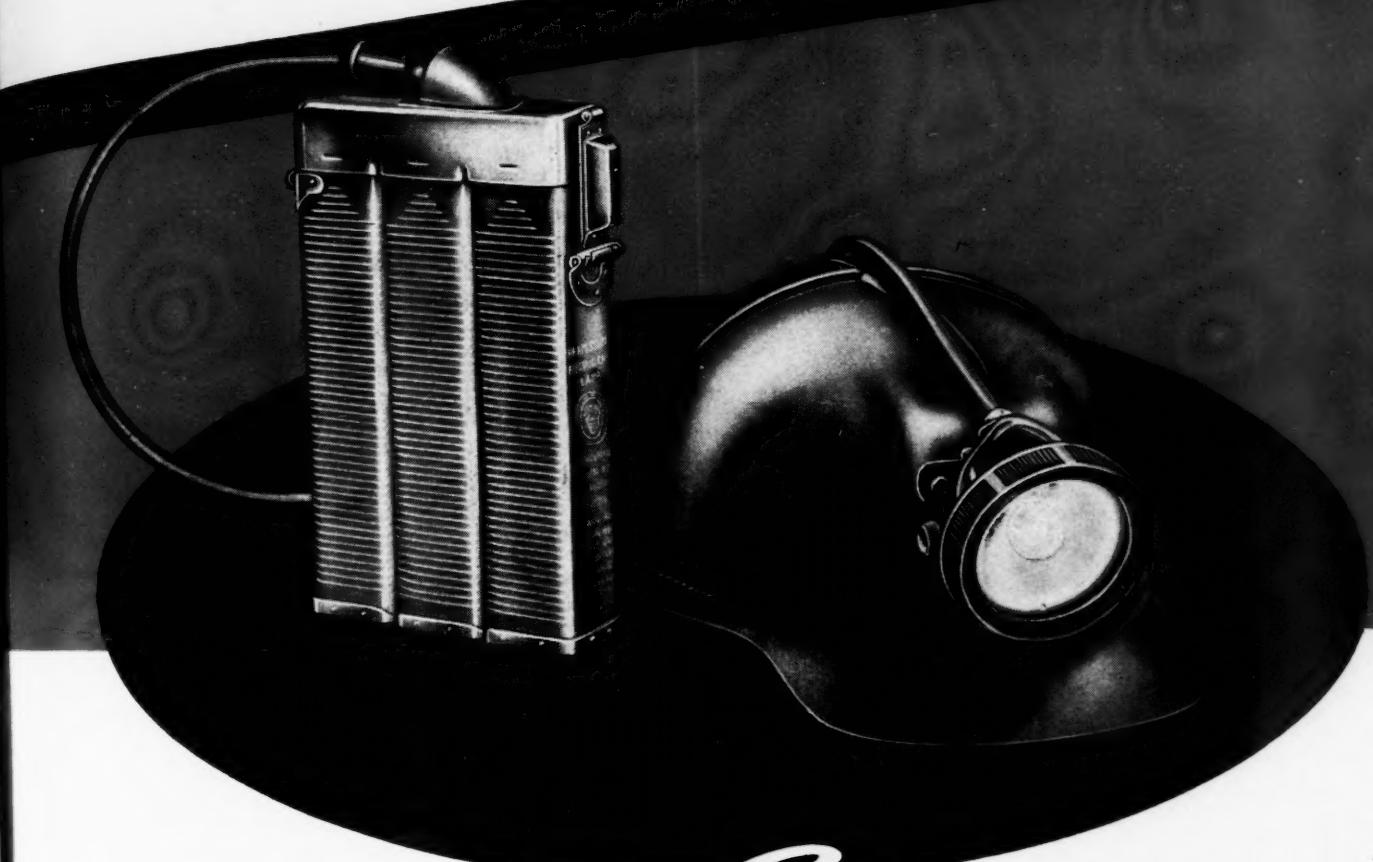
A Standard Oil Lubrication Engineer will be glad to help you test Improved Stanoils to show how their high stability and clean operation can save maintenance time and money. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

STANDARD OIL COMPANY (INDIANA)



UNIQUE in construction
UNIQUE in performance

Better to serve
MINE SAFETY



Edison ELECTRIC CAP LAMPS

The unique steel-alkaline construction of the famous Edison battery assures dependable power at all times for the *more effective* light of the Edison Electric Cap Lamp . . . providing maximum service over many years of useful life.

The M.S.A. Comfo Cap's unique *high-pressure molded* laminated bakelite shell joins with smooth, low-crown design and comfortable inner band and cradle to assure top protection and wearing ease at all times. Write for descriptive Bulletins; let us arrange a demonstration!

AND

**M. S. A.
COMFO CAPS**



MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS AND MEADE STREETS PITTSBURGH 8, PA.

District Representatives in Principal Cities

In Canada

MINE SAFETY APPLIANCES COMPANY OF CANADA, LIMITED
TORONTO . . . MONTREAL . . . CALGARY . . . VANCOUVER . . . NEW GLASGOW, N.S.

SOUTH AMERICAN HEADQUARTERS

Casilla 722, Lima . . . Agents in Principal Cities

MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD.

Johannesburg, South Africa . . . Cape Town, South Africa

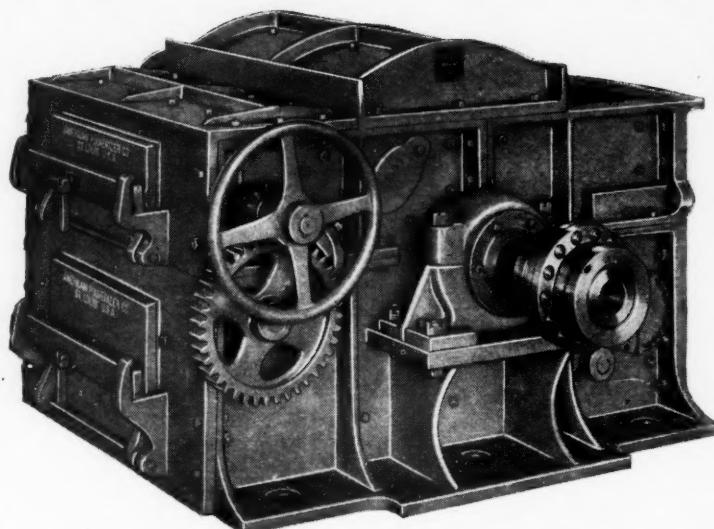
THERE'S EFFICIENT, LOW COST COAL PREPARATION

Wherever there is an
AMERICAN CRUSHER...

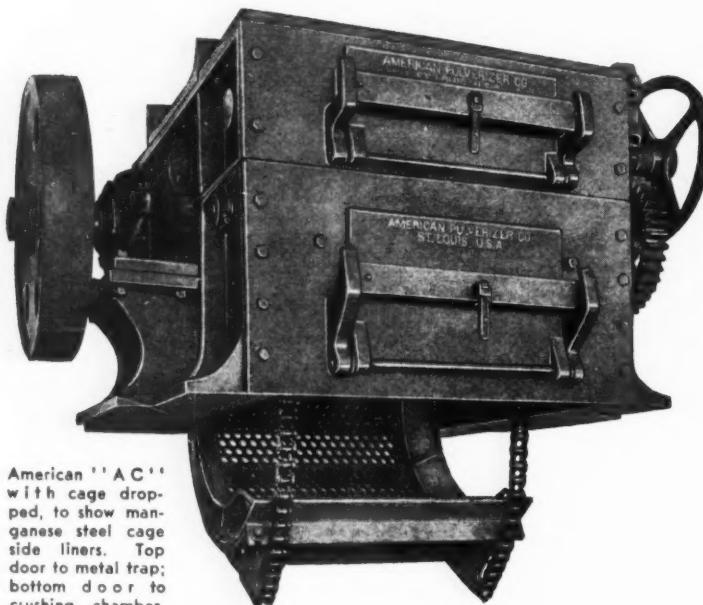


**Ask any of the
many who
operate Americans**

The experience of many mine operators has proved that the increased efficiency of their preparation plants and their low operating costs have resulted from the operating features of American Rolling Ring Crushers. Only American Crushers employ the shredder rings which reduce ROM or lump with slow-speed, rapid, splitting impact instead of crushing action. High tonnage of uniform screenings is produced with low power demand and with over-all operating cost of—less than 1¢ per ton!



American AC Rolling Ring Crusher



American "AC" with cage dropped, to show manganese steel cage side liners. Top door to metal trap; bottom door to crushing chamber.

The American "AC" Type Crusher is designed for great flexibility for changing size runs to meet current market demands. Double adjustment is external and easily accessible. Note hand wheel at right drops cage for easy screen changes. External, eccentric adjustment for grinding plate.

Notice Americans compact design which requires minimum headroom. Ability to withstand enormous crushing strains and long-life endurance under continuous, severe operation are evident in American's massive, high-test cast construction.

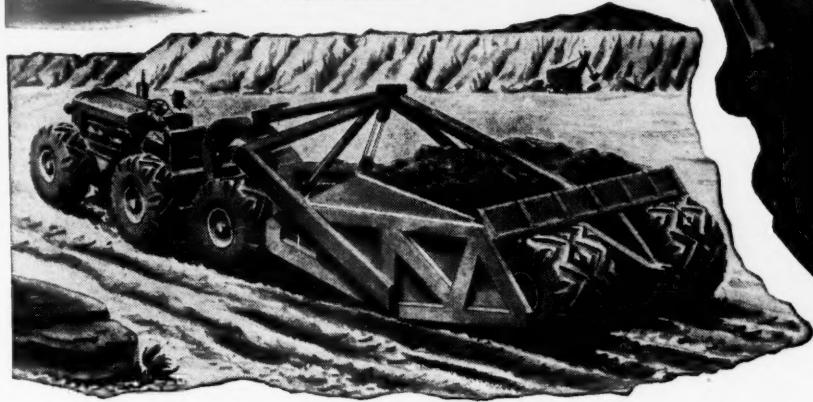
There's an American custom-built to fit your operation,—in capacities from 50 to 500 TPH.

Send for "AC" illustrated bulletin with specifications and coal crushing data.

American **PULVERIZER COMPANY**
Originators and Manufacturers of
Ring Crushers and Pulverizers

1119 Macklind Ave.
St. Louis 10, Mo.

THE GENERAL DEEP CLEAT



The Quality-Built Contractor's Tire that Makes Payloads Pay!

Like a boxer "rolls" with the blow . . . General's Shock-Absorber construction *absorbs* the shocks and impacts of punishing service . . . avoids the service damages that commonly cause tire failures.

This exclusive construction principle of General Off-the-Road Tires *distributes* shock loads and stresses uniformly throughout the tire carcass . . . stops damaging concentrations . . . offsets the common causes of bruising . . . snagging . . . tearing and blow-outs.

Built throughout to General's famous Top Quality, General's shock-absorber constructed Off-the-Road Tires provide a new standard of long, continuous service and economy to heavy contractors.

ROCK
SPECIAL




**GENERAL
TIRE**

THE GENERAL TIRE & RUBBER CO. • AKRON, OHIO



Here's a Graveyard that pays BIG dividends

MANY profitable mine car graveyards have been made this year. Why? Because it pays big dividends to discard old-fashioned mine cars and install the wonder cars—the modern S-D 1-2-3 "Automatics." Records show that they save an average of at least 26 cents per ton and you can rent them from us at an average cost, over a fifteen year

period, of less than 2 cents per ton of coal hauled in them. Of course, in buying them outright, you can make even more money than this, perhaps, because we make a profit out of it on the rental basis. You can produce far more coal per man with S-D "Automatics" and you can produce it at the least possible cost. Write us and we will prove this to you beyond question.



FACTS BEHIND OUR CLAIMS

Records taken from the books of several coal mines prove an average saving of at least 26 cents per ton. Not so long ago, a big operator wrote us as follows: "Our savings with S-D 'Automatics' will pay for the cars in less than 20 months." We are getting letters like this all the time. There is no question about the savings. Another operator writes: "In equipping a new mine, our first and only thought regarding cars is S-D 'Automatics'." Still another writes: "Your new type S-D 'Automatic' car with 'Floater' wheels is without doubt the best car we have ever used. At one mine we have been able to produce 47,000 tons in one month with only 100 of these cars." These are facts, all of them. Would you like to have photostatic copies of the complete letters and others besides? Write for them.

DON'T WAIT to put in new S-D "Automatics". Get busy now and, if you haven't enough cash on hand at the moment, let us rent them to you.

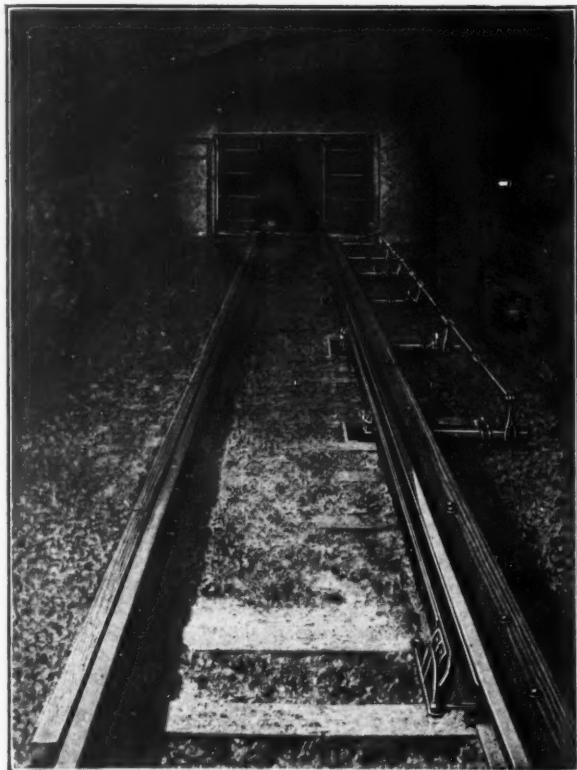
We prefer to equip our mine cars with S-D "Floater" Ball Bearing Wheels. We guarantee that they will run the first five years with only one greasing. Scientific engineering tests prove that these remarkable wheels speed up haulage approximately 10 per cent and increase haulage motor capacity approximately 49 per cent and save about \$5.00 per car in electricity per year, based on cost of 1½ cents per KWH, compared with tapered roller bearings.

Sanford-Day Iron Works, Knoxville 9, Tennessee

FOR SAFE, COST-CUTTING MINE OPERATION

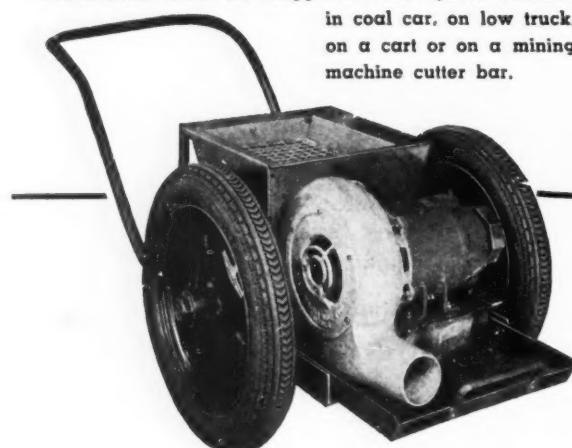
AMERICAN MINE DOOR

Economical, Automatic Safety Devices!



THE MIGHTY MIDGET . . . PORTABLE . . . DOES A WHALE OF A JOB

A powerful rock-duster, equipped with hose nozzle and sufficient cable to reach remote areas. In actual test it distributed more than a ton of dust per hour during an entire shift. It can be dragged, belt-transported, carried in coal car, on low truck, on a cart or on a mining machine cutter bar.

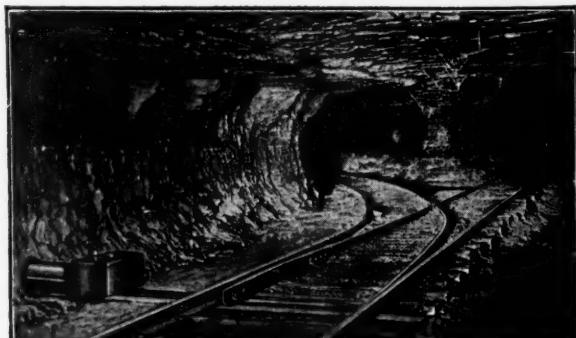


CANTON AUTOMATIC MINE DOORS

These automatic doors operate under heavy pressures—require no attendant—open and close quickly. They are arranged so that one door opens each way, equalizing air pressure and flow. Construction is rigid but weight is kept at a minimum. We can supply CANTON AUTOMATIC DOORS in types to meet every mine condition.

CANTON AUTOMATIC SWITCH THROWERS

. . . does an expert switchman's job and does it faster with complete safety. Automatically throws switch points ahead or behind trip—or both. Trip can maintain full speed. Switch can be operated by remote control, by the motorman or by hand and is adapted for use with our automatic derailler.



Send for descriptive catalog

**AMERICAN
MINE DOOR
COMPANY**

2057 DEUBER AVE.

CANTON 6, OHIO

Available-



• Magazines
* Plants

AMERICAN EXPLOSIVES

From well-located plants and distributing magazines,

AMERICAN explosives and blasting supplies are available for delivery throughout the eastern and middle-western sections of the United States. Produced under intensive research, chemical control, inspection and unremitting care in manufacture, there is an AMERICAN explosive suited to your requirement.

• Capable field engineers are available at your call.

★ HIGH EXPLOSIVES

★ PERMISSIBLES

★ BLASTING
POWDER

★ BLASTING
ACCESSORIES

American Cyanamid & Chemical Corporation



30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

EXPLOSIVES DEPARTMENT

SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill.
Pottsville, Pa. Hazleton, Pa. Maynard, Mass.

TALK ABOUT TIME-SAVING
IN TRACKLESS COAL MINING



A NEW COMBINATION OF JOY MACHINES

team up to cut costs and
production time

Quick movement from the face completes the clockwork timing that assures lower production costs and higher tonnage output. High haulage capacity is a feature of the Joy 42" Shuttle Car, designed especially for high seam work.

JOY
42"
SHUTTLE
CAR

LA-DEL
BELT
CONVEYOR

La-Del chain or belt—gathering or haulage types, can supplement coal movement from Joy Shuttle Cars. They're sturdy, durable and economical in operation.

FOR JOY
SULLIVAN AND
LA-DEL PRODUCTS

Consult a
Joy Engineer

Now
for a
will p
Jo
Machi
turing
most

Now, at last, you need look only to one source of supply for a complete line of trackless coal mining equipment that will produce more tonnage faster, at lower cost per ton.

Joy Manufacturing Company's merger with Sullivan Machinery Company and La-Del Conveyor and Manufacturing Company puts under one management "the world's most complete line of coal mining equipment."

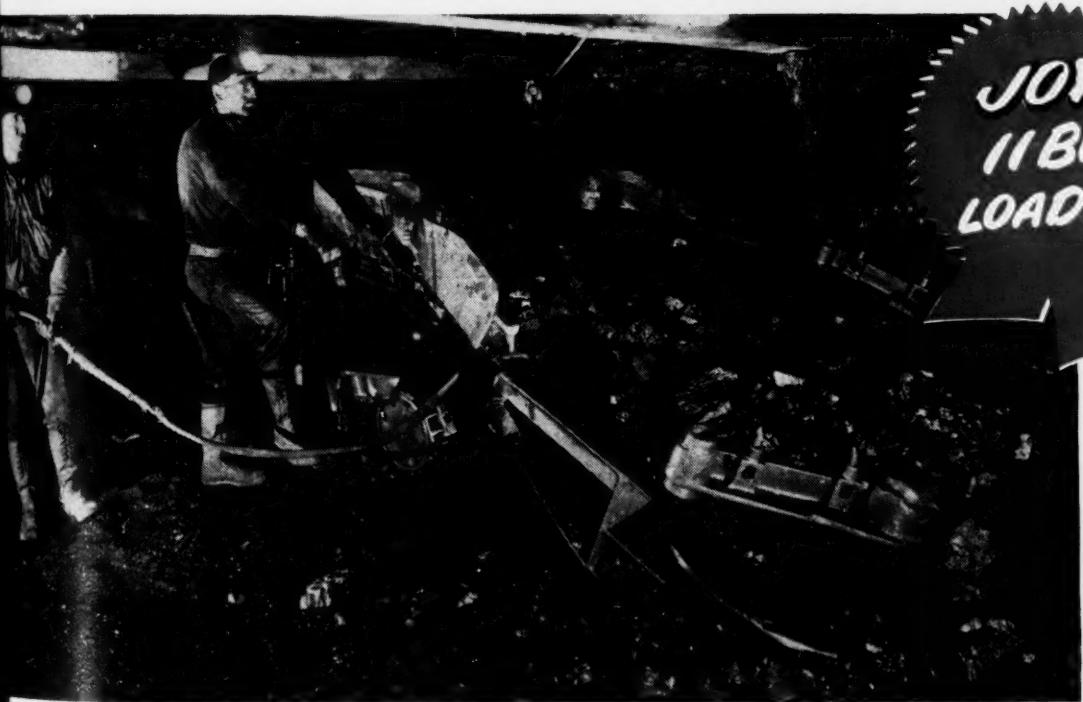
SULLIVAN
10 RU
TRACKLESS
COAL CUTTER



Licensed under the patents to E. C. Morgan No's 1,706,961—1,706,962 1,707,132 and 1,953,325

Universal positioning of the Sullivan 10 RU enables it to shear and cut top or bottom with equal ease. Fast tramping, hydraulic steering and motor drive, proper weight suspension, short wheel base and large pneumatic tires supplement its built-in safety and ease of operation.

JOY
11 BU
LOADER



After cutting, the problem is to load out coal fast . . . and that's the job for the Joy 11 BU. This machine really digs in . . . moving up to 10 tons per minute. Rugged in construction, time-proved for low maintenance costs.

JOY MANUFACTURING COMPANY
CHIEF OFFICES: 101 W. OLIVER BUILDING
PITTSBURGH, PA.

Shoot
that heavy
Overburden
Down
to size...
... with
PRIMACORD



You won't make any real money until you reach the coal! Therefore, if you can shoot down to size without secondary blasting, you'll save time — labor — materials, and get at the coal faster.

PRIMACORD Detonating Fuse accomplishes this with *extra* effectiveness through its tried and proved time-delay feature that lets you plan for more efficient shot sequence . . . Loading with PRIMACORD makes

every cartridge in the hole *go* with the force of a primer cartridge . . . the hook-up made with square knots and half-hitches is easily checked before the blast.

When you add to these advantages the fact that PRIMACORD fears no stray currents because caps never go into a hole and are never attached until just before the blast, it's easy to see why you'll strip better, safer and faster when you use PRIMACORD.

SP-30

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT
PRIMACORD-BICKFORD
Detonating FUSE

Also
ENSIGN-BICKFORD
SAFETY FUSE
Since 1836

August, 1946 • COAL AGE



AUGUST, 1946

Ivan A. Given, EDITOR

Not by Default

HOW LONG the status quo in seizure—how long the bituminous industry can exist half slave, half free—still was a question at the time this was written. But status quos seldom remain such and consequently it can be accepted that the coal situation is due for a change sooner or later. The question is: "Will the change be toward the restoration of the properties to their owners or will it be in the direction of more usurpation of power over the industry by federal officials acting as agents for Lewis as well as on their own account?"

Even a cursory study of New Deal history makes it evident that any seizure could be turned into nationalization of the properties involved—not directly but by the back door. Under the New Deal, federal officials have consistently favored labor leaders and just as consistently have tried to create a situation where they could make their own law, bypassing or stultifying Congress. Thus, in the case of the tidelands oil bill, Secretary Krug, on July 26, declared he would recommend a veto because the Supreme Court "and not the Congress should decide the issue." Thus, also the drive to unionize supervisors in spite of the will of Congress as expressed in the Case bill. Thus, further, the disregard, in the present as well as past seizures, of the 60-day clauses of the Selective Service and War Labor Disputes acts. And so on. Perhaps nationalization is not the aim of the government-Lewis combination and perhaps fears that it will take place are groundless. But it also is true that if Lewis wants to force continuance of seizure and government officials want to play along, the stage could be set for nationalization without Congress and the people ever having a chance to pass on the question.

If coal is nationalized by the back door it will be solely because federal officials consider it their first duty to appease labor leaders—and will set the precedent for additional nationalization of other industries by the same route. Coal's record—in investments for higher efficiency, higher quality, greater income for miners, safer working conditions, better living conditions and more efficiency in utilization by the consumer—in no way justifies nationalization, however arrived at. But nationalization should not be allowed to take place by default. The alternatives facing the operators are either detrimental

to industry and employee welfare or downright difficult. But difficult though action may be, coal should bear down—in the courts and with employees, the public and Congress—to make sure that the industry remains a free industry dedicated to better service to the Nation.

Guides to Efficiency

COAL has long considered efficiency, which means higher wages to miners, lower cost to consumers and an improved competitive position, one of its No. 1 objectives. The future, assuming seizure ends soon without further jeopardizing the position of the industry and its employees, will put an even greater premium on efficiency. Only thus will the industry be saved a part of the beating that the recent government-Lewis blitz has made almost inevitable.

Thin seams naturally add up to a harder problem because low height restricts equipment choice and makes working more difficult. But there are certain fundamentals that, if duly applied, automatically tend to boost efficiency. Perhaps first, as in all mining, is good transportation, generally meaning room and mother conveyors if not main-line units in addition. If loading equipment can be employed at the face, it means more tons per man compared to loading by hand. Deep cuts and wider places, increasing tons per fall, raise individual productivity.

Since moving a thin-seam unit, particularly of the conveyor type, involves loss of production as well as a substantial cost, territories should be as large as possible, meaning more and deeper working places up to the practical limits of conveyor capacity in case conveyors are used. Small territories increase moving expense and idle time. Provision should be made for fast, efficient handling of supplies and repair parts. Special pullers, trucks, reels and other units should be provided to facilitate moving production equipment and assemblies. Finally, after these and other steps are taken, including education of supervisors and men, the face cycle should be overhauled to prevent all possible delays at that point. Full application of these fundamental principles, experience has proved, insures increases in tons per man of up to 100 percent or more.

SEIZURE: ROAD TO NATIONALIZATION?

Could seizure be the first step toward nationalization of the coal-mining industry? Many believe so—and with reason. To help mining men head off this danger, Coal Age analyzes the seizure situation and shows why the industry's record of progress in no way justifies nationalization—either directly or by the back door.

By IVAN A. GIVEN
Editor

And W. A. STANBURY JR.
Assistant Editor
Coal Age

CAN THE COAL industry be nationalized? If it were a fair-and-square decision in the only place where such a decision could lawfully be made—Congress—the answer is "No!" The industry's record, if nothing else, is sufficient assurance that it would be continued as a free enterprise. But nation-

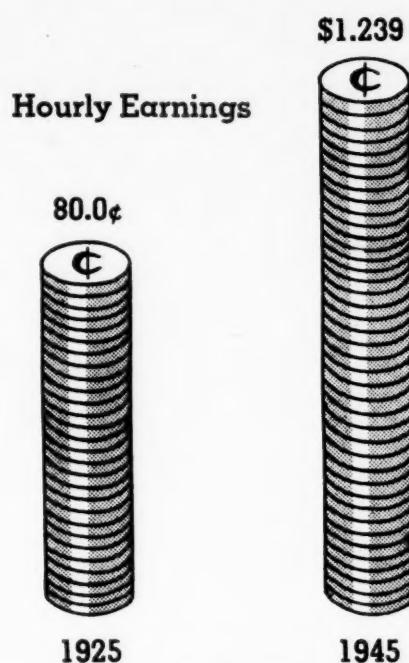
alization through seizure, to enable federal officials to appease a labor leader, is another thing entirely. If, as long as federal officials consider it their first duty to help a labor leader and that labor leader feels he can do better with said officials, thereby prolonging the seizure, at least part of the groundwork is laid for back-door nationalization. Then, if Congress fails to act, the only remaining hurdle is the courts, which so far have tended to side with labor leaders and their federal supporters against Congress and the public.

What leads to this conclusion that seizure could turn into back-door nationalization? Why should the hazard be any greater than in previous seizures,

including that planned but never put into effect by Franklin D. Roosevelt in the piping New Deal days of 1939 before the war gave federal officials a new excuse for arbitrary action? For one thing, administrators in previous seizures were men from industry. Now, all men in the coal mines administration are either Navy or on the regular government payroll, with the exception of the safety advisor. Before, the government contract was addressed primarily to money for miners. Now, the government has obligated itself to broad-scale "social reforms" with the implication that the properties may be retained until they are accomplished—even if it takes years. Before, the gov-

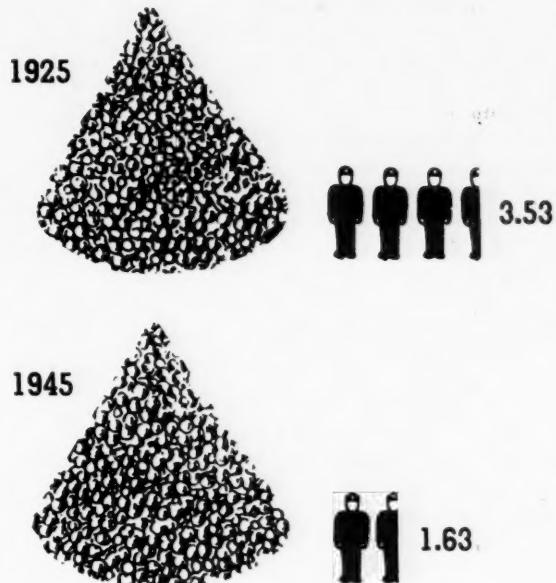
COAL MEANS PROGRESS

Increased Employee Income



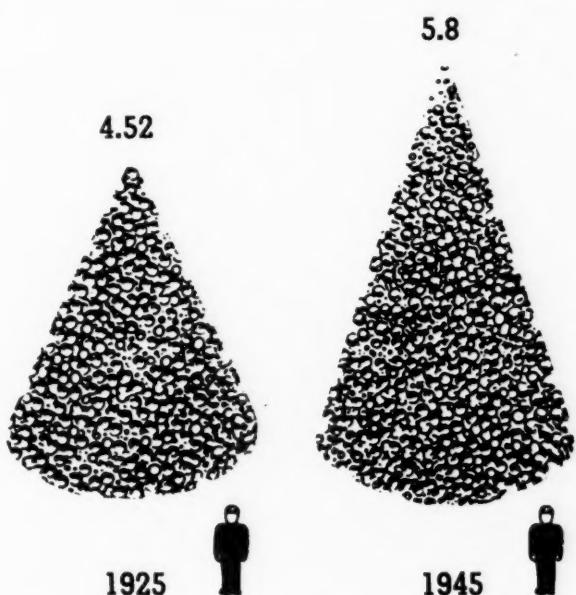
Greater Safety

Fatalities per Million Tons Produced



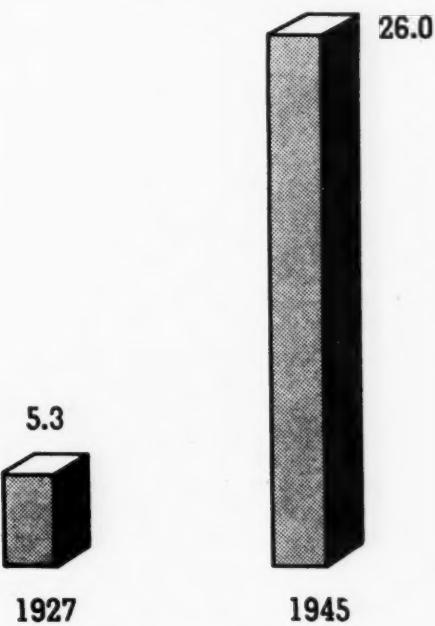
Higher Efficiency

Tons per Man-Shift



Higher Quality

Percent Mechanically Cleaned



Through its own efforts, without aid from the outside, coal has passed all the tests of a healthy, progressive industry. There is no justification in its record for nationalization—either directly or by the back door.

ernment at least moved to get an industry contract as quickly as possible. Now? Events to date are the answer.

One of the more curious sidelights of the latest coal seizure is the eagerness with which the federal government, which itself has no formal contracts with labor leaders, rushes forth to sign in the place of the property owners it has displaced. Another and more dismaying outgrowth of the seizure is the attempt of government officials to elbow the coal operators completely out of the picture. Their position was stated by Harry I. Rand, assistant attorney general, appearing for the coal mines administrator in the Jones & Laughlin case decided in favor of the administrator by the U. S. District Court for the District of Columbia June 26. Jones & Laughlin sued to prevent signing of a contract recognizing the United Mine Workers as representative of the company's supervisors. Said Mr. Rand:

"It is our position essentially, first, that the U. S. government, in the operation of properties which it constructs or acquires, has the same authority to do with these properties and to deal with respect to them as any private proprietor has, and that no stranger to the operation has the standing in any court of law or court of equity to challenge the method of operation of these properties." The "stranger" in this declaration is of course the owner of the property. Said Mr. Rand in addition:

"It is our further position that even if the defendants [the federal officials] might be exceeding their powers under the statutes, the court has no authority to review the actions taken by these defendants."

Government officials excuse all this by saying in effect that they had to do it—that if Lewis didn't get his way he would keep the industry shut down. They clothe it in a little different language but that is what it boils down to. They report that Lewis is hurt and angry at what he terms the "nefarious" conduct of the operators—apparently meaning their attempts to get somewhere close to equality in bargaining. And these officials also talk at times as if the operators were guilty for not giving in to any and all demands.

Against the "giving in," the picture might be clarified a little by looking into Mr. Lewis' interests. If his concern were solely that of the miners and the coal industry, one conclusion might be drawn, although not necessarily the only one. The evidence indicates, however, that he has another objective dearer to his heart—enhancement of his standing in other fields on which he has an organizing eye. A resounding victory, therefore, was necessary, regardless of its effect on the industry and the

public. To get it, he was willing to throw the industry into seizure—and presumably is willing to keep it there if he thinks it will serve his purpose.

The situation, therefore, dresses down to the fact that government officials feel that Lewis must be appeased and that if seizure and retention of the mines are necessary to that end, so be it. They use parts of wartime legislation to give their actions an appearance of legality but ignore others, notably the 60-day clauses of the Selective Service and War Labor Disputes acts. These acts provide that in case of seizure, "such plant, mine or facility shall be returned to the owners thereof as soon as practicable, but in no event more than 60 days after the restoration of the productive efficiency prevailing prior to the taking of possession thereof."

The mines were seized May 22, the government signed a contract with the union on May 29 and on May 30 the miners were scheduled to go back to work. Production of coal got under way at the normal level on June 3 and since has been running at 11 $\frac{1}{4}$ to 12 $\frac{1}{4}$ million tons a week, or normal for the industry. Thus, the 60-day period, at the outside, expired Aug. 3, using the "productive efficiency" criterion.

At the time of this writing, however, there were no visible signs that the government was going to get out of the seizure business. Officials apparently were relying on the "principle" stated by Ex-Attorney General Biddle Jan. 14, 1944, in response to a request from Ex-Secretary Ickes for an opinion on retaining the mines in this earlier seizure. Biddle held that "productive efficiency" would not be restored and the 60 days would not begin to run as long as Ickes believed that a new strike would follow relinquishment of the properties. Apparently, Biddle's definition of "productive efficiency" must have come to him in a

New Deal dream because a careful reading of the acts reveals no mention of fears or opinions of Interior secretaries as criteria for "productive efficiency."

Examination of the opinion itself, even without the actions of government officials, leads inevitably to the conclusion that those officials define "productive efficiency" as appeasement of labor leaders. By standing on the opinion that property cannot be returned as long as there is a belief that a strike will be resumed, federal officials make any other finding impossible. A labor leader can present any demands he wants and threaten a strike if they are not met in full before the properties are returned, thus, under the Biddle opinion, prolonging seizure as long as government officials want to play along. So far, they seem to be inclined to continue appeasement tactics indefinitely and so far, also, there is no evidence that Lewis will not rig things to prolong seizure on the theory that he can get additional concessions from the government easier than he can otherwise. The longer seizure goes on and the more the affairs of the industry are involved by appeasement actions by government officials, the harder "unseizing" becomes, thus paving the way to back-door nationalization by the stroke of a pen and without the only competent body—Congress—having a chance to pass on its merits, if any.

No one can say for sure at the present time that back-door nationalization will take place. Neither can anyone state positively, in view of the prevailing situation, that it will not. If nationalization should take place as a result of the present seizure, it will be only because federal officials put appeasement of a labor leader first, because the coal industry's record certainly proves its right to continue as a free enterprise dedicated to better service to the public.

The Record—Real Progress

How an industry has gone about bettering its service to the public and benefitting its employees is the only fair test of its progressiveness—not appeasement of a labor leader. Coal, not so many years ago, encountered difficulties that would have swamped an industry deficient in managerial courage and enterprise. Coal met the test, however, and in meeting it has proved to the hilt its right to continue as a free enterprise. Nothing in its record justifies any claim that it should be taken over and put in a federal straitjacket—either directly or by the back door.

Events during and immediately following World War I resulted in a finding even then that coal had within itself the ability to discharge its responsibilities to the public and to its employees. As is the case now, Lewis then was giving coal the benefit of the attentions only he is capable of—attentions that resulted in the long and bitter strike of 1922 and the setting up of the U. S. Coal Commission in 1922 and 1923 to investigate the industry and recommend a course of action. That report, among other things, gave the coal operators an opportunity to assess



Heavy expenditures for equipment to raise efficiency reflect coal's willingness to discharge its obligations to its employees and the public. These expenditures have made possible higher wages for miners and lower-cost coal to the user—both marks of a progressive industry

the industry's problems and plan its course. It said, among other things:

"To pay fair wages, to remove the causes for sullen hostility which prevails to an astonishing extent among workers. . . to make mining a safer occupation. . . to sell at a reasonable price that will bring a fair return to investors with steady operation of the mines, to establish a reputation for clean and well-prepared coal, to standardize fair practices in contracts between seller and buyer, to lay out and develop the mines in such a way as to conserve and economize the coal and bring it to the market at the least expense, to come through clean as an industry capable of solving its own problems with a minimum of government supervision—all this is already clear in the minds of many operators, miners and dealers. . . This commission, after exhaustive examination of the evidence collected by its own agents and submitted by all interested parties, has greater confidence in such internal organization and such educational work as will promote these remedies than in any way which it is within the power of Congress or legislatures to apply, essential as we believe some legislation to be."

By all these criteria, coal has made real progress. It was not made without difficulties, however. Among other things, government encouragement of the development of mining properties left the industry at the end of World War I with an enormous overcapacity to produce. World War I also brought about the beginning of a campaign to economize in the burning of coal—a campaign that the operators got behind and still are behind but which had an immediate, major and cumulative effect on demand. World War I also brought

other competitors into the picture. Thus the industry was caught between the devil and the deep—excess capacity to produce on one side and economy in use and increasing competition on the other. Liquidation of excess capacity was a must job and the industry had anything but a pleasant time while that process went on. Then it ran into the depression of the early 30's.

Between 1918 and 1923, overdevelopment, encouraged, as stated, by the government, pushed bituminous producing capacity up from 650 to 885 million tons annually, based on a 280-day work year, raised the number of active mines from 8,319 to 9,331 and increased employment from 615,000 to 705,000 while production dropped from 579 to 564 million tons. By 1929, the most of the liquidation was completed, reducing the number of mines to the more realistic figure of 6,057, a decrease of over 3,000, and bringing capacity down over one-third to 679 million tons—more in line with demand. The process continued, although at a slower pace, through the early depression years.

Responsibility Accepted

Few industries have had to withstand the shock of such a drastic reorganization of their operations. It stands to the everlasting credit of the coal industry that it took it on the chin the way it had to and still persisted in its efforts to arrive at a sound basis of operation, fair to its employees and better organized to serve the public. Congress—wisely—adopted no legislation throwing road blocks in the way of the industry. Coal men did not ask the government to bail them out. Leaders of the industry saw the job that had to be done and got busy.

The tough times of the 30's found coal men still unwavering in their faith in the industry's future and their determination to press for further improvements. In 1931, for example, the bituminous industry, according to income-tax figures, lost \$48,784,000 after federal taxes. In that same year, nevertheless, it spent over \$21,000,000 for machinery and equipment to increase efficiency, promote safety, improve working and living conditions and improve product quality. In 1932, the industry's deficit was \$51,944,000; its expenditures for improvements over \$15,000,000. In 1933, when things began to look a little better, the deficit was \$48,578,000 and expenditures for improvements over \$18,000,000. These years, plus 1930, were the low points in all the industry's history. Lately, expenditures for new and more efficient facilities have been running several times those of the depression lows. These figures lead to no other conclusion but that coal men were determined to discharge their responsibilities in spite of difficulties of great magnitude. They definitely refute any argument that coal was lying down on the job and consequently should be nationalized—directly or by the back door.

Management's determination to make coal mining a better industry is evidenced in many other directions. Take wages, for example. The miner took it on the chin with the operator, true, but he also has progressed as a result of management initiative and determination. In 1914, according to the Bureau of Labor Statistics, bituminous miners earned an average of 35.8c. per hour. By 1925, it was 80.0c. The low was 50.1c. per hour in 1933, when the industry's efforts began to bear fruit. In 1935, average hourly earnings were



Bituminous coal helps its customers by intensive research into more efficient fuel utilization. It backs up research by heavy investments in equipment to heighten quality—another reason why it in no way deserves nationalization, either directly or through the back door.

74.5c.; in 1945, \$1.239. There is nothing in these figures to warrant any other conclusion but that operators are willing to share the gains in coal mining with their employees.

With more money, miners have been the beneficiaries of widespread improvements in housing, community welfare, improved working conditions and better safety. In 1914, the number of men killed per million tons of bituminous coal mined was 4.40. The rate was down to 3.53 in 1925, 2.60 in 1935 and, in 1945, dropped to 1.63. Progress has been made, although some might quarrel with the rate. Nevertheless, there is nothing in the industry's safety record, as well as its earnings figures, to justify pressing for nationalization because of failure to advance in earnings, working and living conditions and safety.

Another and equally vital characteristic of a progressive industry is what it is doing for its customers in the form of cost, quality and service. Here, again, coal's record is clear. While liquidating its excess capacity and improving its financial structure, the industry stepped up the installation of machinery and improved its properties for better utilization of its manpower. In a little more than 20 years, underground tonnage loaded mechanically at bituminous mines increased from 1.2 percent in 1925 to 56 percent in 1945, reflecting increasing adoption of loading machines, conveyors and other labor-conserving equipment at the face and elsewhere, paralleled by improved mining methods.

That results have been attained is evidenced by the increase in tons per man-shift with consequent benefit to the consumer while augmenting at the

same time the income of the miner. In 1914, when average hourly earnings were 35.8c., production per man-shift in the bituminous industry was 3.71 tons. In 1925, when hourly earnings averaged 80.0c., tons per man was 4.52; 1935, 74.5c. per hour, 4.50 tons; 1945, \$1.239 per hour, 5.8 tons per shift. Analysis of these figures is further proof that the industry has been more than willing to share with its employees. Between 1914 and 1945, for example, earnings per hour increased 246 percent; tons per manshift, 57 percent. Any other year may be chosen as the starting point but it still comes out that miners' earnings have risen faster than productivity, meaning that developments have been in their favor.

Consumers Pay Less

Developments also have been in favor of the user. In other words, while his coal is costing him more as a result of increases in wages, it is costing him far less than it would have if the industry had not made its heavy investments in improved methods and equipment over the years. If, for example, the 1920 productivity had still prevailed in 1945, instead of the actual figure of 5.8 tons, meaning that the labor cost (nine-hour day, \$1.239 an hour) would have had to have been calculated on a basis of 4.00 tons per day instead of 5.8, bituminous coal would have cost the consumer at least 87c. more per ton. Thus, the saving on the 1945 tonnage was in excess of \$511,000,000. The coal industry's investment in equipment and methods, therefore, has meant real savings for the consumer—the mark of a progressive industry.

Coal's efforts also have meant large savings to consumers in another direction—useful energy per pound of product burned. This involves both better burning equipment and a reduction of impurities in the coal, in addition to the uniformity that promotes efficient use. Mechanical cleaning inherently insures a cleaner, more uniform product, and coal consequently has bought heavily of modern plants involving such equipment. This is evidenced, among other things, by the fact that the percentage of bituminous coal mechanically cleaned has risen from 3.8 in 1920 to 26.0 percent in 1945. Accompanying activities have included better sizing, dustproofing, freeze-proofing and removal of tramp iron, all to the end of increasing the benefits to the user.

On top of expenditures for better preparation, operators have increased their funds for research until in 1945 half a million dollars was pledged to improve coal-burning methods and equipment and broaden the scope of utilization. In addition, the industry, with several railroads, has embarked on the development of more efficient and economical coal-burning locomotives. Scientists and engineers employed or assisted by the bituminous industry are working on projects which include better design of homes, more efficient chimneys, ash-removal stokers, improved automatic coal-feeding devices and smokeless burning equipment for both the home and the factory. Conversion of coal to oil and better methods of gasification are among other projects being undertaken for the user's benefit.

Coal's preparation and utilization record, like its records in other directions, definitely disproves any conten-

tions that it is a moribund and unprogressive industry that must be fixed up by nationalization.

Coal also has come through another test with flying colors—ability to meet extraordinary demands in time of national crisis. Because of its enlightened policy of self-improvement, manifested in a sound financial structure, foresighted business management, modernization of production methods and improved relations with employees, coal met the nation's wartime needs in full in spite of diminishing manpower and

without the help of federal subsidies or violent disruption of its established operating economy. Called upon to meet the huge demands of war-gear industries, the armed services and our allies, the industry put its shoulder to the wheel and pushed production to a new high of 620,000,000 tons. It was the only major industry in the United States to produce more and more with fewer and fewer men—certainly no indication that it is a weak and helpless cripple needing the tender ministrations of a federal bureaucracy.

with ill-advised concessions in the areas of wage policy, managerial prerogatives and "social planning" that greatly increase the industry's burden. Possibly to pile Pelion on Ossa, rumor has it that Lewis, if he should decide to relax his grip, will do so only at the price of complete control over the welfare fund, another wage increase and other concessions.

The alternatives facing coal producers are not happy ones. First, they can wait it out, hoping that Lewis and his federal henchmen will relent, that wartime legislation will run out (a prospect now quite a while off) or that Congress will act (an event that also must be postponed in view of the fact that the present body was scheduled for early adjournment, not to return). Waiting it out has the drawback that it might be a lengthy process, during which industry affairs might become so tangled that "unseizure" might become very difficult.

The second alternative is to march up and take whatever medicine Lewis might want to administer, regardless of justifiable fears of its effect on the welfare of the industry and its employees. That medicine might well be a stiffer dose than the government contract, especially if Lewis felt he had an advantage he could press.

Not by Default

The third alternative, assuming seizure continues, is fighting a holding action, through the courts or otherwise, to prevent too great a change in the status quo until there is an opportunity to present the facts to Congress and the public. The new Congress, there is reason to believe, will be more inclined to clip the wings of would-be nationalizationists. The industry has been severely shocked and discouraged by this latest in a long series of government-Lewis blitzes, but that shock and discouragement should not lead to nationalization by default.

Coal men have reason to feel proud of the real progress made through their unsparing efforts. They have solved their problems in the past and they have the right to continue to meet and solve any others the future may bring. They should, in fact, leave nothing undone to see that coal mining remains a free, private enterprise progressing through better service to the public.

Fears of nationalization may prove unfounded, although the fact remains that it is a possibility—by the back-door route. Certainly there is nothing to justify it in the industry's record. That record is coal's greatest argument for continued freedom for better service to the Nation.

Coal's Job—Fight for Freedom

To contend now, while the bituminous mines are in the hands of the government, that the industry is moribund and helpless, that federal control should be extended indefinitely, that nationalization of the mines, whether by considered legislation or through the back door by executive decree, will result in better service to the nation is to fly in the face of the facts. All the evidence is against it, including nationalization efforts in other countries, notably Great Britain. Yet seizure could turn into nationalization by the back door through attempts of government officials to appease a labor leader. That opinion also is held by people outside the coal industry. For example, E. T. Leech, editor of the Pittsburgh Press, in an article in the New York World-Telegram, July 22, had the following to say:

"With the passage of time it becomes increasingly apparent that the coal mines have been virtually nationalized by default. It has been done without public approval or Congressional legislation. What happened in England only after a national election and Parliamentary action took place overnight in the United States by executive edict. One of the most momentous changes in our history was made in spite of our constitutional system of checks and balances, representative government and protection of property rights. It was done under legal fiction—the claim that America is at war. The coal mines are being run under war powers more than 14 months after Germany surrendered and almost a year since the surrender of Japan."

Pointing out what has already been made clear in these pages, that labor leaders tend to force seizure in the hope that they can get more out of the government, Mr. Leech warned that labor, too, might become "strangers to

the operation," concluding as follows:

"This question of what eventually happens to the coal mines is one of the most vital that has confronted the United States. It involves fundamental questions of property and individual rights. It could—I don't say it will—be the start of a system of national socialism in this country.

"The next few months will tell. The wonder of it all thus far has been how easily the job was done under our constitutional system that has withstood so many other attempted inroads—just by a few words by one man."

Barring a change of heart by Lewis, his federal supporters or both, bituminous coal men find themselves in one of the most difficult situations in history. Through labor-leader intransigence and federal partiality, reflected in perverted use of wartime statutes and fiat action, they find themselves in danger of being elbowed out of the industry they have brought up to an advanced level of service and responsibility through painful effort and heavy investments of money and brains. They are, at the moment, "strangers to the operation," despite the fact that the record shows that the lion's share of the credit for industry advancement is theirs.

Stating the situation is relatively easy. Stating what should or can be done is another and much more difficult matter as long as the present federal favoritism to labor leaders continues. Government surveys of health, welfare and safety are not yet completed and, after completion, may involve recommendations that may form the basis of pressure for continuance of control. Lewis shows no signs of modifying his course and operators have found little reason to believe that they will be given a break. The best that can be said is that federal capitulation has saddled the industry

LOADERS AND DUCKBILLS

Meet Varying Conditions at Blue Pennant

Two Seams 3 to 10 Ft. Thick Mined Simultaneously in Change to Full-Mechanical Operation—Recovery Reaches 98 Percent—Four M. G. Sets Replaced With Three Rectifiers — Preparation Facilities Increased

By J. H. EDWARDS
Associate Editor, Coal Age

MOBILE LOADING MACHINES working territories with a 98 percent recovery, new cutters, self-loading conveyors for full-recovery mining and rectifiers re-

placing all rotating substation units at one fell swoop are among the many improvements of the last few years at the Blue Pennant mine of the Glogora Coal Co., Boone County, West Virginia, which produced 3,500 tons daily pre-war and now ships 1,900. Engineering, with its careful planning and striving for low-maintenance construction, are

evident in methods, equipment and layout at this mine. One reason is that Carl B. Metzger, of Philadelphia, president, W. F. Pioch, general manager, P. H. Burlingham, sales manager, F. J. Hughes, general superintendent, are all engineers, while Thomas Hughes, chief engineer, has had long experience in his profession. Simultaneous mining of con-

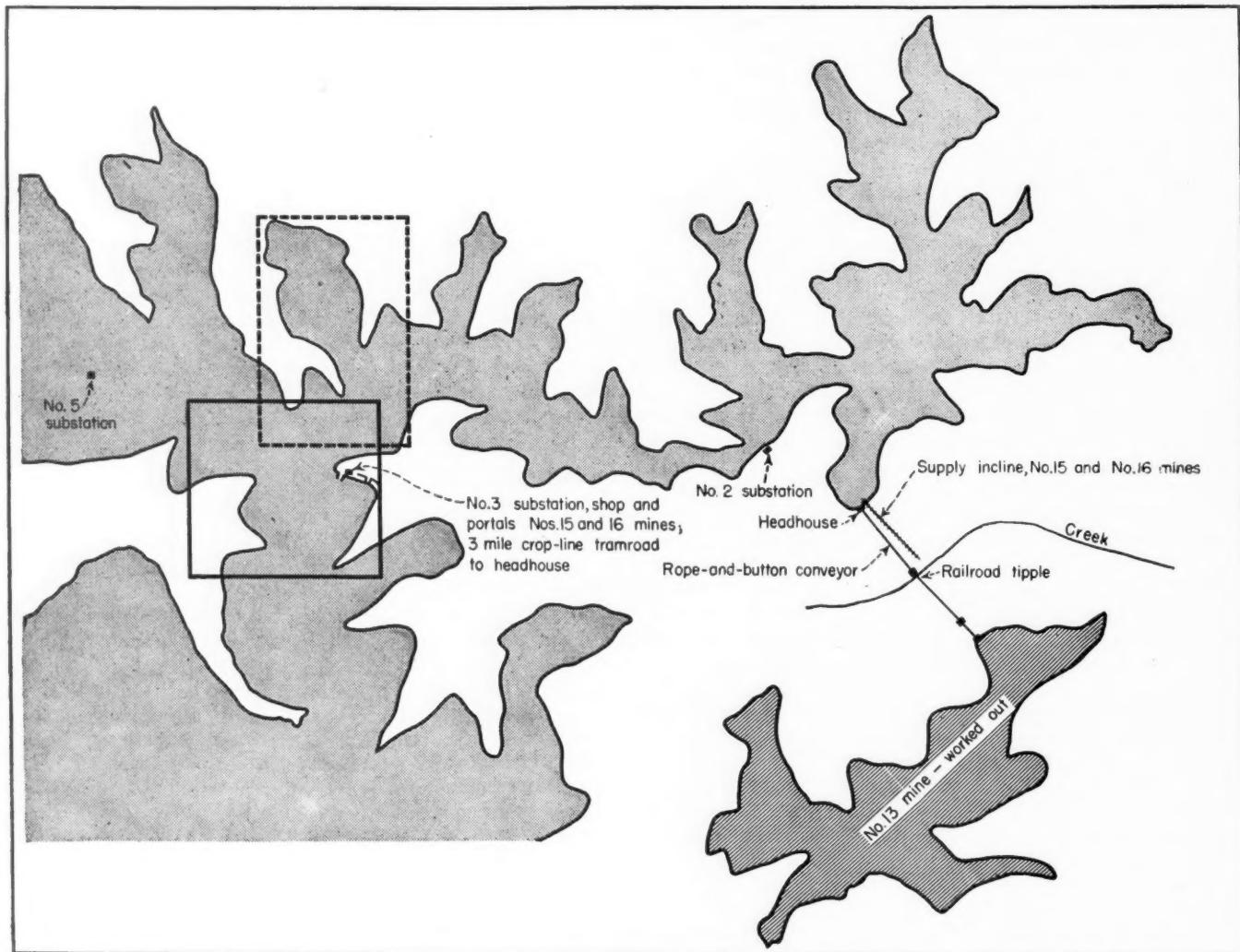


Fig. 1—Crop-line map indicating irregular shapes of No. 5 Block territories available to Blue Pennant mine. New territory under development is at the left toward No. 5 substation. Broken-line rectangle shows limits of Fig. 2, representing a portion of No. 15 mine; full-line, Fig. 3, showing a portion of No. 16 mine.

tiguous seams separated by small intervals calls for meticulous layout and close supervision. The tipple was modernized by installing additional crushers and vibrating screens.

Blue pennant, the mine post office, is within two miles of Whitesville. At present, the mine is working the middle and lower splits of the No. 5 Block (Kittanning) seam, with a 35- to 70-ft. interval between, lying in crop-bounded irregularly shaped areas near the tops of the ridges. This blocky coal, known as West Virginia splint, is low in ash, high in fusion and heating value.

Railroad-track elevation at the tipple is 1,110 ft. Elevation of the headhouse is 1,920 ft. and that of the No. 8, or main, portal of No. 15 mine is 1,927 ft. Haulage from this No. 8 portal to the headhouse is via an underground track approximately $1\frac{1}{2}$ miles long or can be detoured by a 3-mile tramroad that is practically level and closely follows the crop line. No. 15 mine is in the Middle Kittanning split, but in this article it will be termed the upper split because there is no minable Upper Kittanning split on the property. The contiguous seam below, the Lower Kittanning, will be called the lower split.

Right Side Opened

For some years the mine was equipped only for mining the left-hand side (looking up the creek, Fig. 1). The No. 5 block was worked out on that side and the Dorothy, 350 ft. below, was developed to a production of 1,500 tons when, in 1938, it was decided to develop the No. 5 Block on the other side of the valley and leave the thinner Dorothy for a future date. Accordingly, a rope-and-button conveyor (Fairmont, 1,240 ft. long, 35-deg. pitch) was installed on the right-hand side together with a dump house. The dump house includes a hoist for dropping trips in and a man-and-supply incline with an unusual arrangement discussed later in this article.

Faults encountered in the seam delayed development and called for changes of plans in the No. 5 Block, which explains the main portals being three miles via crop-line tramroad from the headhouse. At these openings, accessible also by a $2\frac{1}{2}$ -mile truck road with 19-percent maximum grade, are located new installations which include an electric shop, a fan ventilating the workings in the two seams, No. 3 rectifier substation, supply house, mine office and modern buildings for storing explosives. The State is scheduled to grade and improve the road as a short cut from Whitesville to Madison and also as a short cut from Beckley to Huntington.

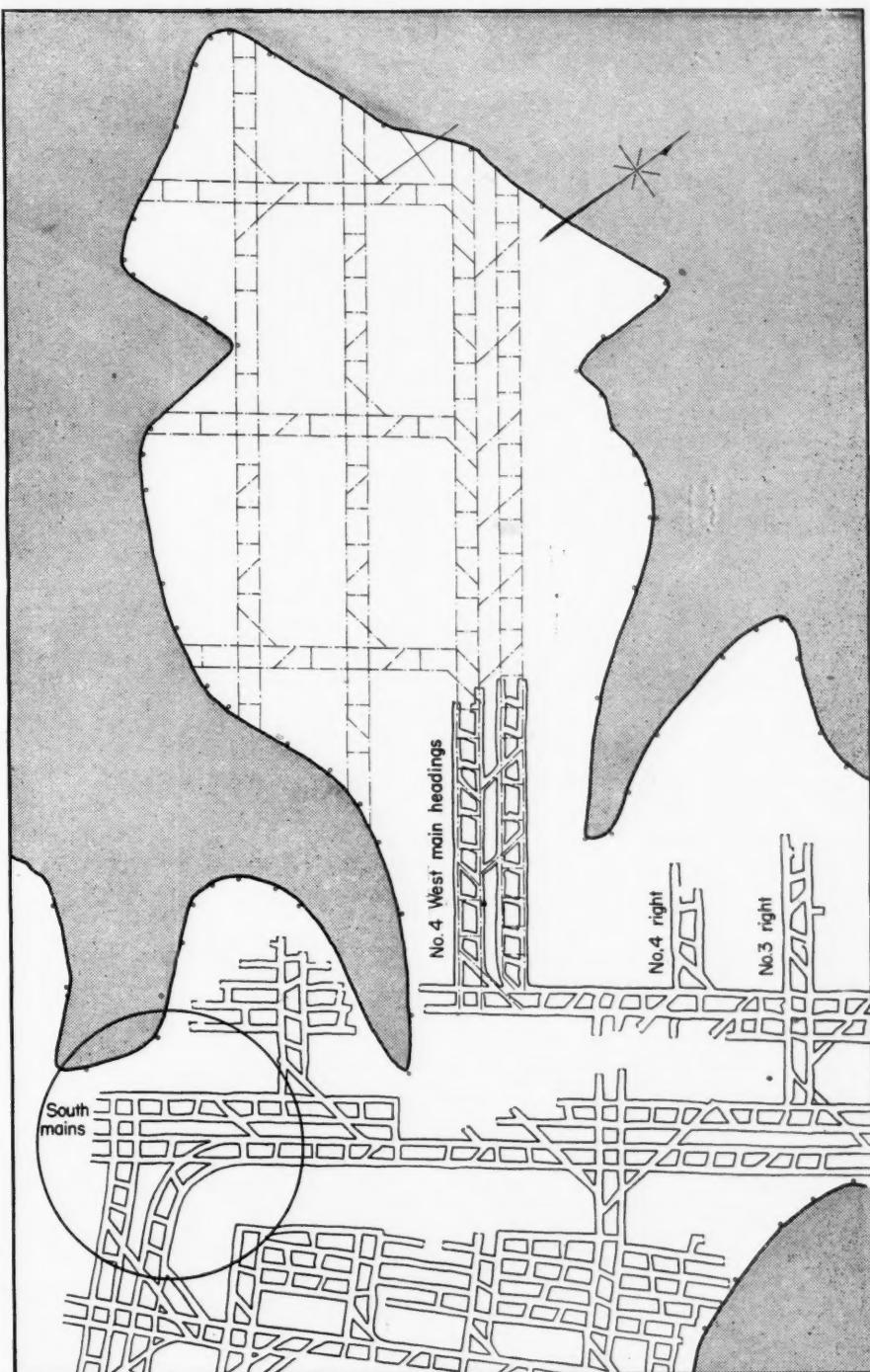


Fig. 2—Section of No. 15 mine (top split) showing projection for mobile-loader mining. The territory of this map is indicated by the broken-line rectangle in Fig. 1. Comparison with Fig. 3 shows columnized development at South Mains junction (circled).

Both splits of the No. 5 have good main roofs with drawslate in some sections. The upper seam (No. 15 mine) is 10 ft. thick and 32 in. from the bottom has a parting running from knife-blade thickness to 20 ft. In some sections this seam is being mined with large track-mounted mobile equipment but in others, where the parting thickens and the bottom bench thins, shakers and duckbills were installed about a year ago for mining above the parting only.

A special rock loader was purchased for taking bottom.

The lower split (No. 16 mine), 35 ft. below the other at the portals, runs 6 to 7 ft. thick and contains a boney lamination near the top. Here the cutting is done in the parting and the coal is loaded with track-mounted machines equipped with water sprays.

To fill out the preliminary picture, it should be stated that the fan and new buildings are at the level of the upper

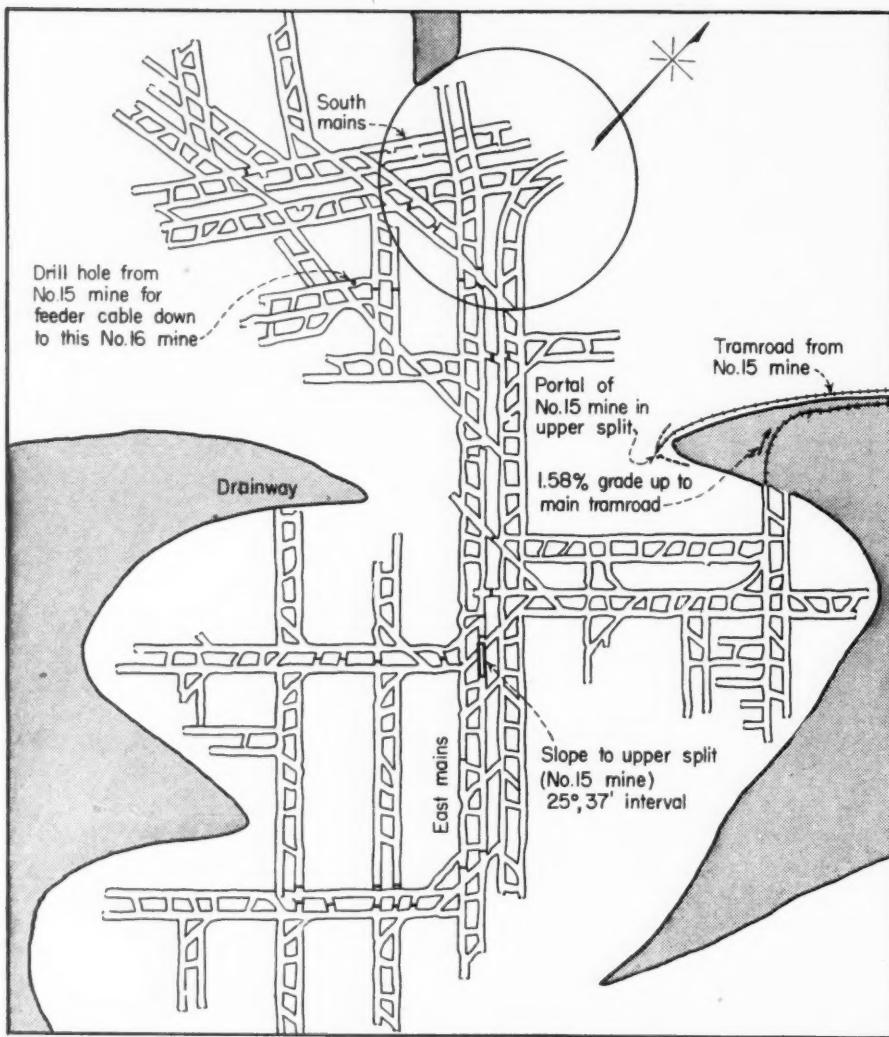


Fig. 3—The new No. 16 mine (lower split) is operated exclusively with mobile loaders. The territory in this map is indicated by the solid-line rectangle in Fig. 1.



The new track-mounted cutters in No. 16 mine have 200-gal. water boxes on top. A wetting agent is added and a centrifugal pump delivers the water to the nozzle. The coal is 6 ft. thick, the place 22 ft. wide and the kerf 6 in. from the top.

split (No. 15 mine). The outside haulway from the portal of the lower split (No. 16 mine) mounts on a 1.58 percent grade to join the main tramroad 2,800 ft. from the portals.

A slope was driven through the 37-ft. interval 1,400 ft. inby these portals to connect the two mines for ventilation and at the same time serve as a short cut in bringing equipment up to the electric shop on the upper level. A further advantage of the slope is access for travel, thus making for better supervision. For the 60-lb. track on this slope (7x14 ft., 25 deg.), the vertically curved rails at top and bottom were ordered pre-fabricated. A hoist moves equipment up and down the slope.

Roof Conditions Vary

Sections of No. 15 mine (upper split) with thin partings (up to 36-in.) are worked with Jeffrey 29B arcweld machines cutting under the parting and two Whaley No. 3 Automat track-mounted loaders. Over about half the territory the roof is a strong sand rock while over the remainder is a draw slate up to 5 ft. thick between the coal and strong sand rock. The draw slate is held in place in rooms by 6x10-in. by 14-ft. crossbars on 4- to 6-ft. centers. It is taken down on main- and cross-entry haulways. After driving 50 to 1,000 ft. in the coal, the slate is shot and loaded as the grading is done. The bottom is soft to medium soapstone, but probably will support rubber-tired shuttle cars.

In mobile-loading work, all rooms and headings are driven 22 ft. wide on 60-ft. centers, with all crosscuts on 100-ft. centers. Faces and butts are pronounced and are a consideration in projections. Shapes of the crop-bounded areas and grades, however, are the ruling factors.

Recovery has exceeded 98 percent in some areas that have been pillared with mobile loaders, and in general recovery has been greater than it had been with hand loading. Ernest Hornsby, mine superintendent, says that with the machine he can take pillar stumps he would not allow hand loaders to tackle.

An unwavering practice of hauling to the outside all rock and slate and thus never leaving any lying against the pillars helps materially in getting all of each pillar and loading clean coal. Getting rid of the rock on the outside is no problem since there are plenty of steep places at crops and along tramroads where it can be dumped over a cheaply constructed tipple.

Mine cars carry $6\frac{1}{2}$ tons machine loaded. These units, built by the American Car & Foundry Co., have 10-in. wooden side boards which can be removed to adapt the cars to thinner

seams at some later date if conditions develop that might call for a transfer. Gage is 44 in. The cars have stub axles and brakes on all four wheels. Tare weight is 5,500 lb. One 6-ton cable-reel locomotive services each loading machine. Two were tried but resulted in an increase in section cost per ton.

With one locomotive changing cars and a standard crew of eleven men the average per shift is 40 6½-ton cars, or 260 tons of clean coal. Peaks of 60 cars are not unusual. A loading machine works four to seven places but the best efficiency, as measured by tons per man-shift on the section, is achieved with but four places. The mains include four headings and the panel or cross entries two. Thus, in some of the development, seven working places cannot be avoided. Four places make an efficient layout because they provide a place for each of the four phases: (1) cutting, (2) drilling and shooting, (3) track work, (4) loading-machine operation.

The eleven-man crew is made up as follows: one section boss, one loading-machine operator, one helper, one clean-up man, one cutting-machine operator, one driller, one shotfirer, two trackmen, one motorman and one brakeman. The cutter operator has no helper.

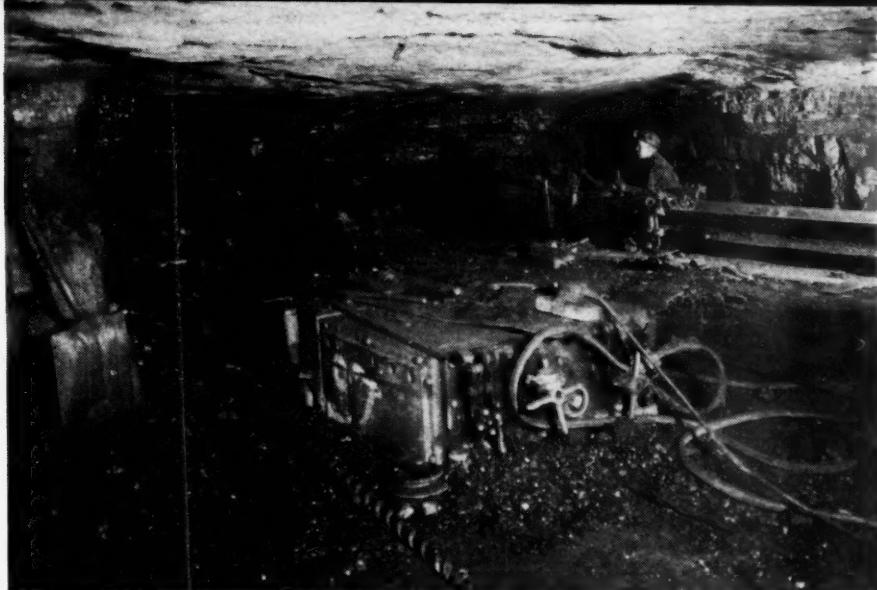
Cover Ranges Up to 200 Ft.

Cover over the No. 5 areas that have been pillared in the upper split (No. 15 mine) ranges up to 200 ft. Ordinarily, no difficulty is encountered in getting a roof break as desired and the breaks extend to the surface, thus relieving weight. One difficulty is horizontal slippage of the hill when pillaring near the crop. One of the accompanying illustrations shows 4½ in. of slip in three months. This slippage takes place in a parting near the center of the seam. In the six days before the illustration was made, the slip had aggregated 1½ in., thus showing accelerated action and indicating to the officials that they would likely have to get the remaining pillars in three weeks or lose considerable coal.

Main-line tracks are constructed with 60-lb. rails on 7x9-in. by 6-ft. ties. For heading development and rooms 40-lb. rails are used. Bethlehem steel ties are employed in rooms and for about 100 ft. outby the working place in development. Main-haulage locomotives are Goodman 13-ton Type 36-B units.

The rock loader was purchased re-

Special bits cutting in the lamination near the top in No. 16 mine. If sand rock is not encountered, a set of these bits cuts 300 places compared to four to six places with plain steel bits.



One heading of a triple-heading entry in a section of No. 15 mine where the parting is over 36 in. thick and mining is confined to the upper bench. Here the coal is 4 ft. thick and the heading is being driven 22 ft. wide. The new cutters with 10-ft. bars and self-loading conveyors were purchased about a year ago.

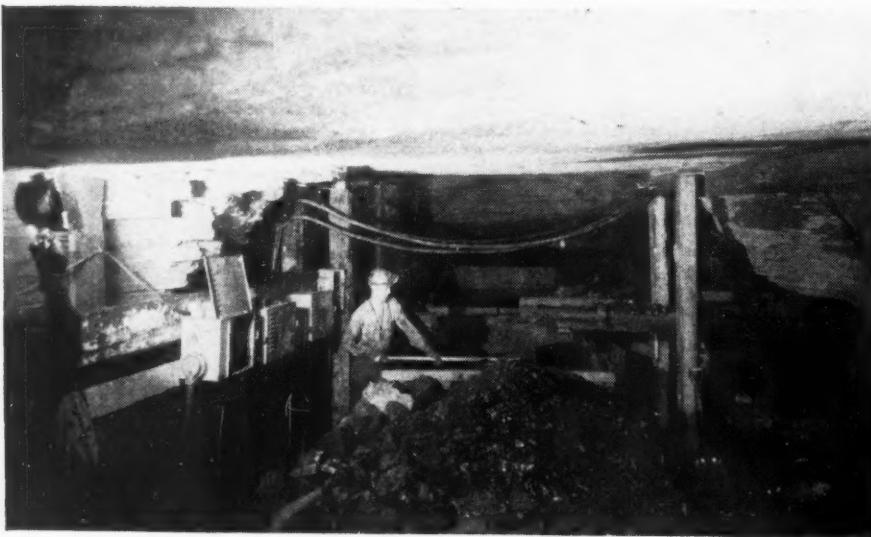


Shovel-action track-mounted loader taking a room pillar in No. 15 mine. Their use makes possible higher recovery (98 percent) with more safety than in hand loading. Pillar-line fall shows at right.





Shovel-action track-mounted machines do all the loading in the new No. 16 mine in the lower split. Here the coal is 6 ft. thick and the place, which is a room heading, is 22 ft. wide.



In driving a triple-heading entry with duckbills in the 4-ft. coal of the top bench in No. 15 mine, the three shakers empty to one car. Two deliver from the right and left and the third by means of a curved nose pan. The empty car in the background is on the end of the track, which is turned up because this is a new set-up and the bottom has been lifted but a short distance in by the loading station.

Looking in by in the same conveyor place in No. 15 mine shown in another illustration. At the left, a shaker drive operates the duckbill in the background. Bottom, consisting of soapstone, is shot and loaded with a new shovel-type rock loading machine to gain height of 6½ ft. from top of rail to roof.



cently. It is a Whaley No. 3-L-S Automat with special features for rock duty. At present, it is being used principally in conveyor development in No. 15 mine but it does some service in the lower split (No. 16 mine). While most parts of this machine are interchangeable with those of the four Whaley No. 3 coal loaders, the jib and rear conveyors have belts instead of chains and flights and the wheels are 1 in. lower. As on the coal machines, the rear conveyor is driven from the tail shaft by means of line shafting with universal joints.

In the full-seam working in No. 15 mine, cutting with arewalls is done in the clean coal 32 in. above the bottom. The parting above the kerf is shot and raked out with the cutting machine and is loaded into cars before the coal is shot. Both mines use 1½x8-in. du Pont and Atlas permissibles for coal and 1½x8-in. Atlas Gel-Coalite for rock.

Where the parting exceeds 36 in., only the upper bench will be mined. This coal, ranging from 36 to 72 in. thick, is being developed for full-recovery conveyor mining. Goodman G12½ shaker conveyors with duckbills and Goodman 312AA shortwalls with 10-ft. bars are in use. An average of 3½ ft. of bottom is shot on the haulage heading of the triple-heading entry and is loaded out with the special Automat to gain height of not less than 6½ ft. from top of rail to the roof.

Bottom Taken for Track

The bottom is taken in frequent lifts so that there is track space in by the conveyor discharge for several empties at the beginning of a new set-up and also so that that phase of the work is completed close to the end of the heading when the conveyor drive is moved up 300 ft. The three conveyors driving a triple-heading entry discharge to one car. Sixteen men constitute a crew and produce 220 tons of coal per shift, not including moving drives. Four men to each face cut, drill, shoot, timber and pan up. Besides these twelve there is a section foreman, a car trimmer, one motorman and one brakeman.

In the lower split (No. 16 mine), the top conditions are somewhat the same as in No. 15; that is, about fifty-fifty good top and draw slate. However, this draw slate does not exceed 16 in. The bottom is a fireclay which is judged too soft for rubber-tired shuttle cars.

Two Whaley Automats now working one shift handle all the loading in this mine, in which the coal ranges from 6 to 7 ft. Two new Sullivan 7AU machines cut in a lamination about 6 in. from the top and the cuttings are loaded out and discarded at the slate

dumps. These machines, equipped with 10-ft. bars and using Kennametal bits, cut 300 places per set of bits if no sand rock is encountered. Plain bits first used on these 7AU machines cut only four to six places per change. Room width is 22 ft.

Dust is allayed during cutting by a spray of water on the cutter bar. Mixed with the water is a wetting agent (Johnson-March "Compound M") in the proportion of one quart to 50 gal. The water is carried in a 200-gal. tank with which this type of machine came equipped. Spray pressure is generated by a small centrifugal pump.

Workings Columnized

Mobile-loader workings in the upper and lower splits (Nos. 15 and 16 mines) are columnized exactly but the conveyor territory in No. 15 mine and the mobile-loading area in No. 16 mine are columnized only to the extent of the mains. The three headings and crosscuts of a conveyor-section main entry are directly above three of the four headings constituting a main entry in the mobile-loading mine beneath. Both mines are developed practically simultaneously to the outcrop but the No. 15 duckbill retreat work is kept 50 to 100 ft. ahead of, or outby, the Whaley pillar mining in the No. 16 below.

Six holes, each loaded with five sticks of permissible, are used to shoot the main block of coal in the 22-ft. rooms in No. 16 mine. The two center holes are fired first, followed by the ones next to the center and lastly the two rib holes. All holes are started 12 in. from the bottom and slanted down to hit the bottom at the back end of the 10-ft. cut. The 6 in. of coal left at the top is popped down by rib holes 3 ft. deep, each loaded with one stick of permissible.

A new Sullivan Type IM 57-lb. rock drill with piston motor feed, 30-in. steel change and sliding trunnion was purchased in the past year for heavy-duty drilling, such as through the interval between splits. A recent job worked from the bottom mine (No. 16) was drilling a hole through the 52-ft. interval to accommodate a 275-volt d.c. cable. Putting a 70-ft. length of General Electric Flamenol 750,000-circ.mil single-conductor cable through this hole saved 2,000 ft. of 500,000-circ.mil feeder. Drilling was started with a 3-in. hole and then the diameter was reduced in steps to 2½ in. for the top, or finishing, section. The cable is grouted into the hole.

The drill also is used to dewater local swags in the upper split (No. 15 mine) by draining them straight down to the lower split (No. 16 mine), from

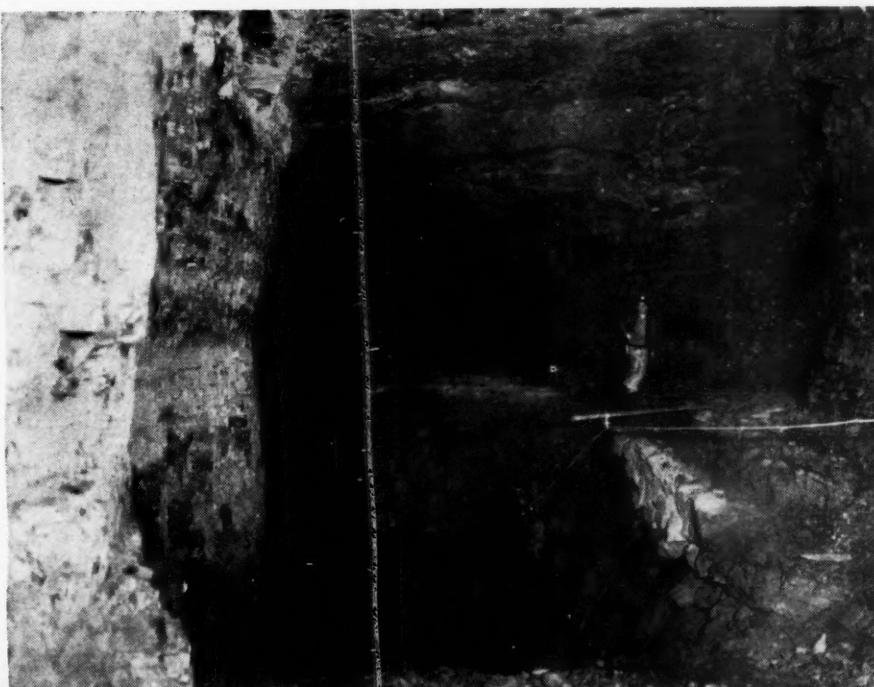


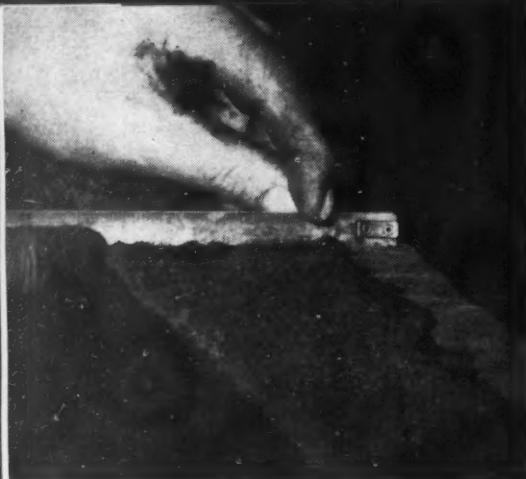
Stub-axle lift-endgate cars carrying 6½ tons have 10-in. wooden side boards which can be removed in case the car should be needed in a thinner seam at some future date.



Good track is a standard requirement in the Blue Pennant mines. This main line in No. 16 includes 60-lb. rail on 7x9-in. by 6-ft. ties. Gage is 44 in.

Slope penetrating the 37-ft. interval between the upper split (No. 15 mine) and the lower (No. 16 mine). Photograph made before the slope track was installed. The slope serves for ventilation, bringing equipment from No. 16 mine to the electric shop at No. 15 and as a manway facilitating better supervision.





Right-hand index finger indicates a horizontal slippage of $4\frac{1}{2}$ in. in three months; and the left hand, accelerated slippage of $1\frac{1}{4}$ in. in six days. Photograph made in a pillar section of No. 15 mine within 125 ft. of the crop.



With an air drill recently purchased, a hole was driven upward from No. 16 mine (lower split) to this No. 15 mine (upper split) to accommodate 750,000-circ.mil cable and saving 2,000 ft. of 500,000-circ.mil feeder. William Hornsby (left) is mine foreman and Ernest Hornsby is mine superintendent.

which the water flows through ditches and drainways to the outside. As a rule, no pumps are used in either mine and the system eliminated water gravitating through crevices and pouring from the roof into the lower split.

The one fan that ventilates the two mines is located near the main portal of the upper mine and is an 8-ft. aeroplane-type unit made by the Hartzell Propeller Fan Co. This fan, operating



Buildings at No. 8 drift, No. 15 mine (upper split). In the distant background (right) are the headhouses and rope-and-button conveyor of the left side of the tipple. The upper tramroad at the left consists of three miles of level haul to the right side of the tipple. The lower left tramroad is a branch off the main and comes down on a 1.58-percent grade to the portal of the newer mine, No. 16, in the lower split.

exhausting at 600 r.p.m. pulls 129,000 c.f.m. at a $\frac{1}{2}$ -in. water-gage with 23.8 hp. For the most part the ventilation is one-way; that is, the intakes are multiple openings made by holes punched to the crop.

Regulators are built with steel doors framed in tile construction and include provisions for padlocking them in position after adjustment (p. 112 of this issue). Overcasts, likewise strong and fireproof, contain manholes for ready inspections (see p. 108).

The change to 100 percent mechanical loading called for additional d.c. substation capacity and emphasized the need for continuous power, low maintenance of equipment and high efficiency of conversion. The existing motor-generator sets were old and low in efficiency. Instead of the half-step procedure of buying one new substation unit, three new rectifier substations were purchased to displace all four of the old motor-generator units.

These rectifiers are Westinghouse 300-kw. sealed-tube stationary-type units with the tubes, switches and control equipment completely inclosed in dead-front steel cabinets. The transformer (4,160-volt primary) stands between the a.c. and d.c. cabinets and is connected thereto at the top by short square ducts inclosing power leads and control wires.

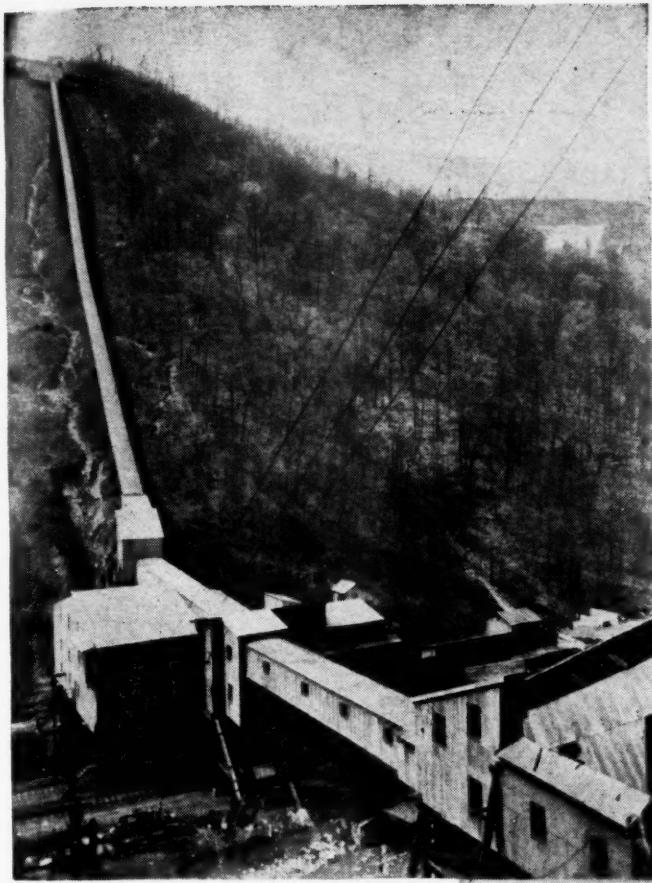
Installation is in three fireproof buildings designed for low maintenance, adequate ventilation and complete protection. The No. 3 building at No. 8

portal, which is shown in an accompanying illustration, is 14 ft. 4 in. by 22 ft. 8 in. inside. Height from floor to caves is 10 ft. 4 in. Walls are tile with glass-brick panels with the whole bonded in brick and concrete. Roof trusses are steel and the covering is Plasteel protected corrugated sheet (Protected Steel Products). Ventilation is through louver-protected openings.

Substation Built for Security

Because of its location, a different design features No. 5 substation. It is on the very top of the hill, elevation 2,111 ft., and in a remote section. Outside appearance was not a weighty factor but protection against vandalism was considered important. Consequently, the windows, used only for entrance of light, are placed high, near the eaves line, so that all vulnerable equipment is below them since lone, unoccupied buildings on high points seem to tempt trigger-happy persons.

Floor-to-eaves height in No. 5 substation is 12 ft. 6 in. Construction includes 8-in. walls of limestone concrete. Outside dimensions are 16x24 ft. The ventilation openings are protected with louvers made of $\frac{1}{2}$ x2-in. angles set in an inverted V with $\frac{3}{4}$ -in. vertical spacings. Thus, they are effective against bullets. Instead of the heat exchanger discharging straight out through the side wall, the air must move up a duct or chimney to a louver-protected opening at eaves height.

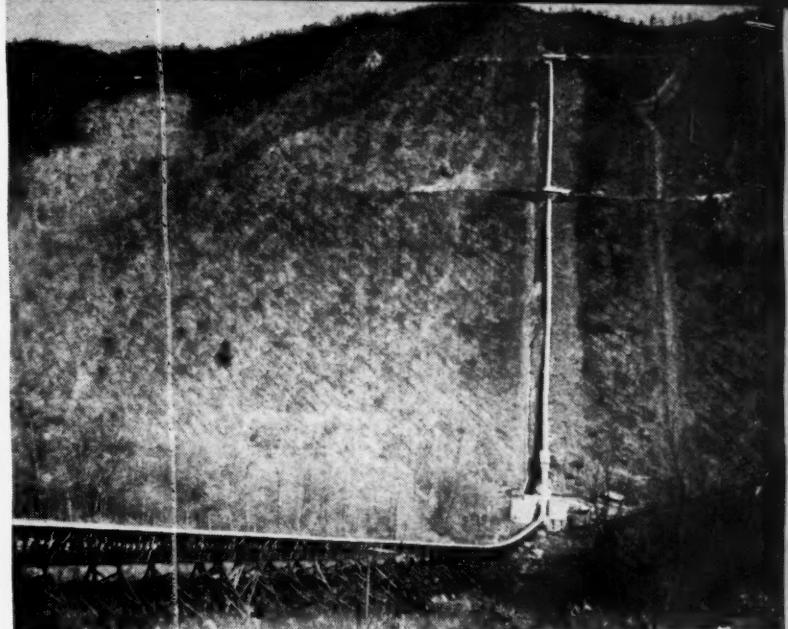


The tipple was built for 300 tons per hour in 1929 and crushers and vibrators were added in 1942 to prepare a wide range of small sizes. The 1,240-ft. rope-and-button conveyor and headhouse on this new side were built in 1942.

Ventilation-intake openings near the floor level can be closed on the inside by sliding steel panels. Even the entrance doors are steel and to discourage tampering with the padlock the hasp is guarded by a 5-in. length of 6-in. steel pipe cut at an angle and welded to the face of the door.

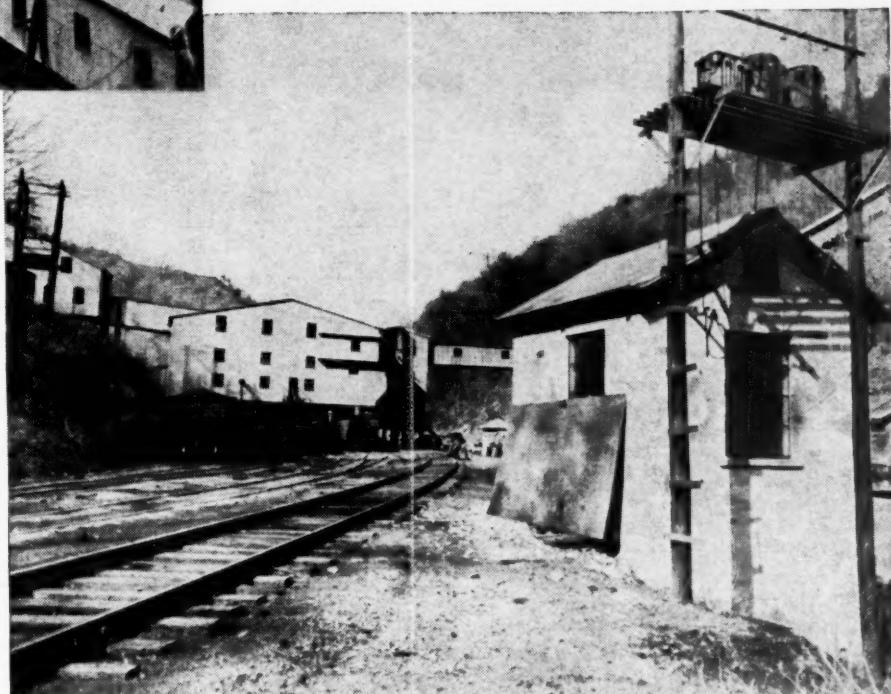
The 275-volt d.c. feeder from this substation reaches the mines through a 3-in. diamond-drill test hole in the building back of the tube and d.c. control cabinet. Depth is 191 ft. to the No. 15 mine and 271 ft. to No. 16. The hole is lined with 4-in. casing to the solid rock. Of the two 1,000,000-circ.mil power feeders, one is bare and the other is General Electric Flamenol cable. The suspension is by a loop of the cable clamped over a 9-in. sheave. There is a third and narrower sheave for a telephone cable. Construction details and a drawing of this suspension appear on p. 106.

At the time of this writing capacitors had not been purchased to correct power-factor. A decision on this was waiting results of a new power rate



View from the active headhouse of No. 15 mine showing the 300-t.p.h. 1,240-ft. rope-and-button retarding conveyor, tipple and the older and inactive headhouses and conveyor on the other side of the valley.

The four-track tipple has three loading booms and three crushers and includes vibrators for making small sizes. A layer-loading hoist is housed in the tile building in the right foreground.

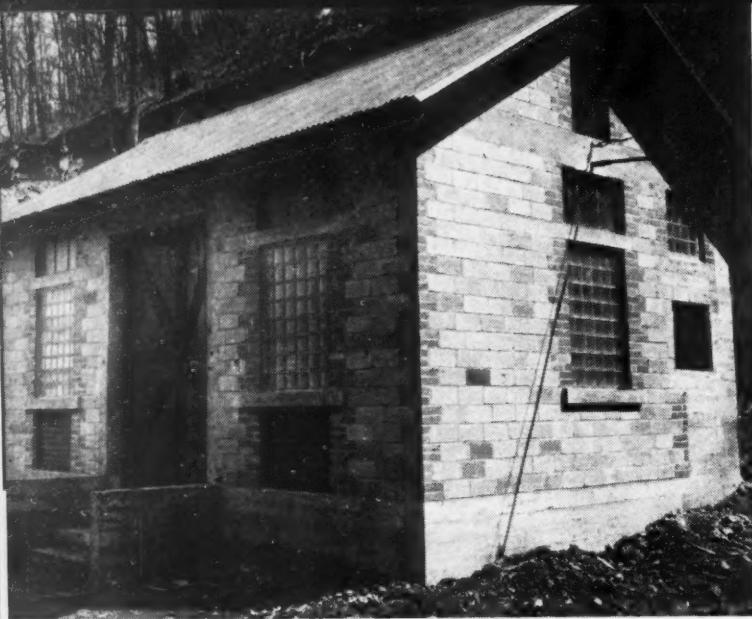


schedule which is just going into effect.

Electrical and mechanical maintenance of underground equipment is centered at the shop at No. 8 main portal, which, as previously mentioned, is 3 miles by outside tramroad from the tipple headhouse and 2½ miles by truck road from the tipple. F. H. Snyder, chief electrician, has his office in a new building near this shop. Since most of the machinery is comparatively new, schedules for frequency of thorough in-

spections and complete overhauls have not yet been standardized. It is the plan to build up spare-part assemblies ready for quick changes.

Fire- and shockproof magazines for explosives were built alongside the main outside tramroad 800 ft. from the No. 8 portal and shop. These buildings are of tile bonded in concrete. They have concrete ceilings and steel roof trusses and are covered with protected steel. One building is 14x34 ft.



Rectifier substation No. 3 at No. 8 portal, No. 15 mine. Construction is tile and glass brick bonded in brick and concrete with steel roof trusses and protected corrugated-metal roofing.



Transformer and d.c. cabinets of the 300-kw. sealed-tube ignitron rectifier in No. 5 substation. Three rectifiers replaced four motor-generator units.



Because it is in a remote section, No. 5 rectifier substation has a steel door, recess-protected padlock and ventilating louvers made of $\frac{1}{4} \times 2$ -in. angles spaced $\frac{3}{4}$ in. vertically.

No. 5 rectifier substation, in a remote place on top of the mountain, is built of limestone-concrete blocks with windows above the level of vulnerable parts and steel louvers for ventilation.

and the other 8x8 ft. Both are ventilated.

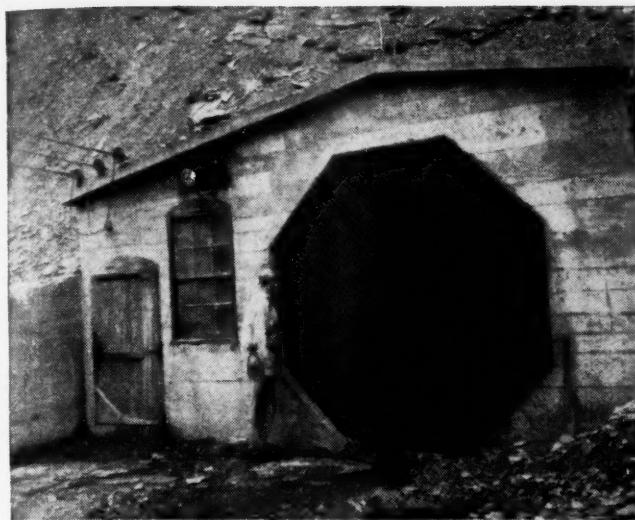
The four-track Fairmont tipple was rebuilt in 1929 to handle 300 tons per hour. Two additional crushers and two vibrating screens were added in 1942 to prepare steam and stoker sizes. All three crushers are McLanahan & Stone and the sizes are 30x48-in., 18x24-in. and 18x60-in. The two vibrators are 6x14-ft. double-deck Ripl-Flo units (Allis Chalmers). As the plant now stands it is capable of preparing any standard size the market demands. It is operated one shift while most of the underground mining equipment operates two shifts.

Quality and uniformity of product

have always received top consideration at the Glogora mines. A fully equipped sampling laboratory is housed in a separate building 90 ft. from the tipple. Sampling is in charge of the engineering department and is done by a trained man who is a member of the tipple crew. From the 2x0-in. slack chute the car trimmer takes a scoop-shovel sample every ten minutes during the day. The coal is ground in a 9x9-in. American pulverizer, capacity 1,000 lb. per hour, $\frac{1}{2}$ x0-in., and the final sample is sent to a commercial laboratory in Cincinnati. That enables the sales agents, the Middle West Coal Co., with offices there, to learn the results with the least possible delay.

Inside dimensions of the sampling building are 7 ft. 4 in. by 26 ft. 6 in. Side walls of this building are worn steel side plates from the sides of troughs of rope-and-button conveyors. These plates, originally $\frac{1}{2}$ in. thick and measuring 16 in. by 6 ft., were butted together and the seams arcwelded.

Tanks for storage of oil for coal treatment are buried in the ground and are surrounded with 6 in. of concrete. Thus, the oil assumes a constant temperature of approximately 58 deg. With the tanks at low elevation, the oil is unloaded from the cars by gravity. Heating at the spray nozzle manifold is done electrically. There are two tanks, each holding 10,000 gal.



One 8-ft. fan ventilates the two mines in the contiguous seams. F. H. Snyder, chief electrician, stands beside the opening.

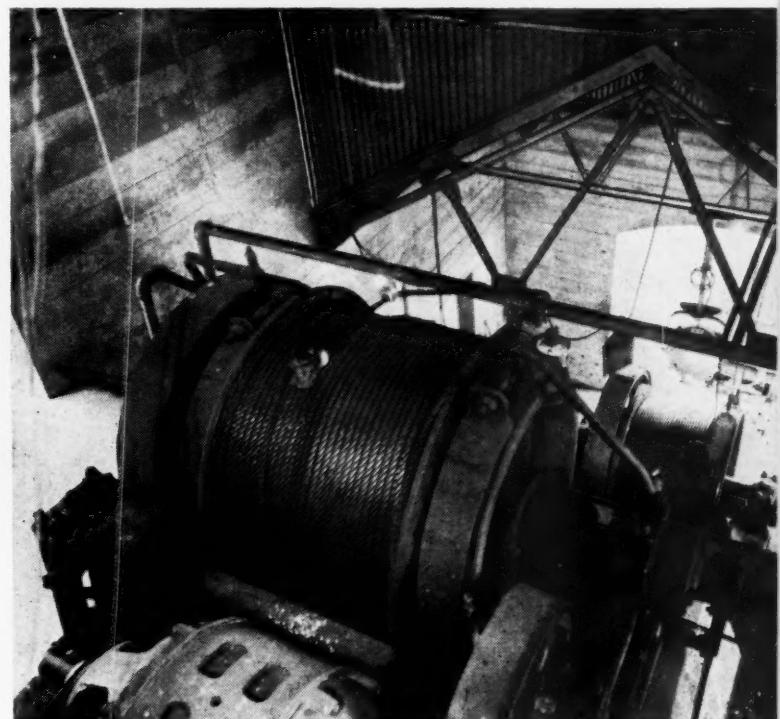


Powder houses for permissible explosives and detonators (background) are fire- and shockproof.



The concrete-and-steel hoist house for the man-and-supply incline has floors on two levels for the main and emergency hoists.

Looking down over the auxiliary (foreground) and regular hoists toward the opening commanding a view of the incline. The socketed end of the rope of the emergency hoist lies on top of the drum in the foreground. The regular hoist is driven by a 100-hp. motor while the emergency hoist is equipped with a 50-hp. motor.



Slack cars are layer loaded with a Brown-Fayro hoist in a tile building 200 ft. upgrade from the tipple. It is controlled from a pushbutton station on the car-trimmer's platform.

The man-and-supply incline from tipple yard to headhouse is considered strategic equipment. Consequently, it was engineered with great care and includes a spare hoist. Failure of some mechanical or electrical part or detection of some condition making safety doubtful, even if occurring at the beginning of a shift, cannot cause loss of the shift. All that is necessary is to put the other hoist into service, connect its rope to the car and disconnect the other rope.

Length of the incline (60-lb. rails) is 1,400 ft. The grades range from 66 to 74 percent and the vertical lift is 810 ft. To accommodate the two hoists and render sheaves unnecessary, the hoist house was built with two levels, the hoist regularly used being on the lower floor and the emergency, or spare, hoist back on a floor at higher elevation.

The regular hoist is a Vulcan unit driven by a 100-hp. motor. The other is a Flory with 50-hp. drive. Both motors are 440-volt wound-rotor induction units. In normal operation, the 100-hp. motor serves also as a governor and brake for lowering. One-inch ropes are used on both hoists. Sturdy, fire-proof, low-maintenance construction is

provided by concrete walls, steel roof trusses and hot galvanized steel roofing.

George B. Garret, Philadelphia, is vice president of the company. G. J. Beidenmiller, Huntington, W. Va., is treasurer and general purchasing agent. T. S. Cleveland, Blue Pennant, is local purchasing agent and William Hornsby is mine foreman. The Glogora Coal Co. also operates at Glo, in Floyd County, Ky., and the same interests, represented by Mr. Garret, operate the North-East Coal Co., which has Thealka mine in Johnson County, Ky. Glogora stems from the Welsh words "glo," meaning coal, and "gora," meaning best. These, however, are phonetic American spellings of the words.

SEMI-PORTABLE PLANT

Prepares Coal From Two Strip Operations

Three-Section Plant Erected in Three Days—Screens and Crushes 800 to 1,000 Tons in Eight Hours—Can be Moved and Put in Operation in Less Than a Week—One Fire-Fighting Unit Keeps Strip Pit Unwatered

A THREE-SECTION semi-portable preparation plant serves two open-pit mining operations of the Bradford Coal Co., at Bigler, Clearfield County, Pa. Except for the concrete foundations, the plant, located just off the highway and alongside a railroad spur in Bigler, was erected in three days with the aid of a railway crane. Powered by a diesel engine, the plant screens and crushes 800 to 1,000 tons of hand-picked run-of-mine coal in eight hours. If need be, the plant can be moved and set up at a new location in less than a week.

The plant, designed and built by the McLanahan & Stone Corp., Hollidaysburg, Pa., consists of three sections:

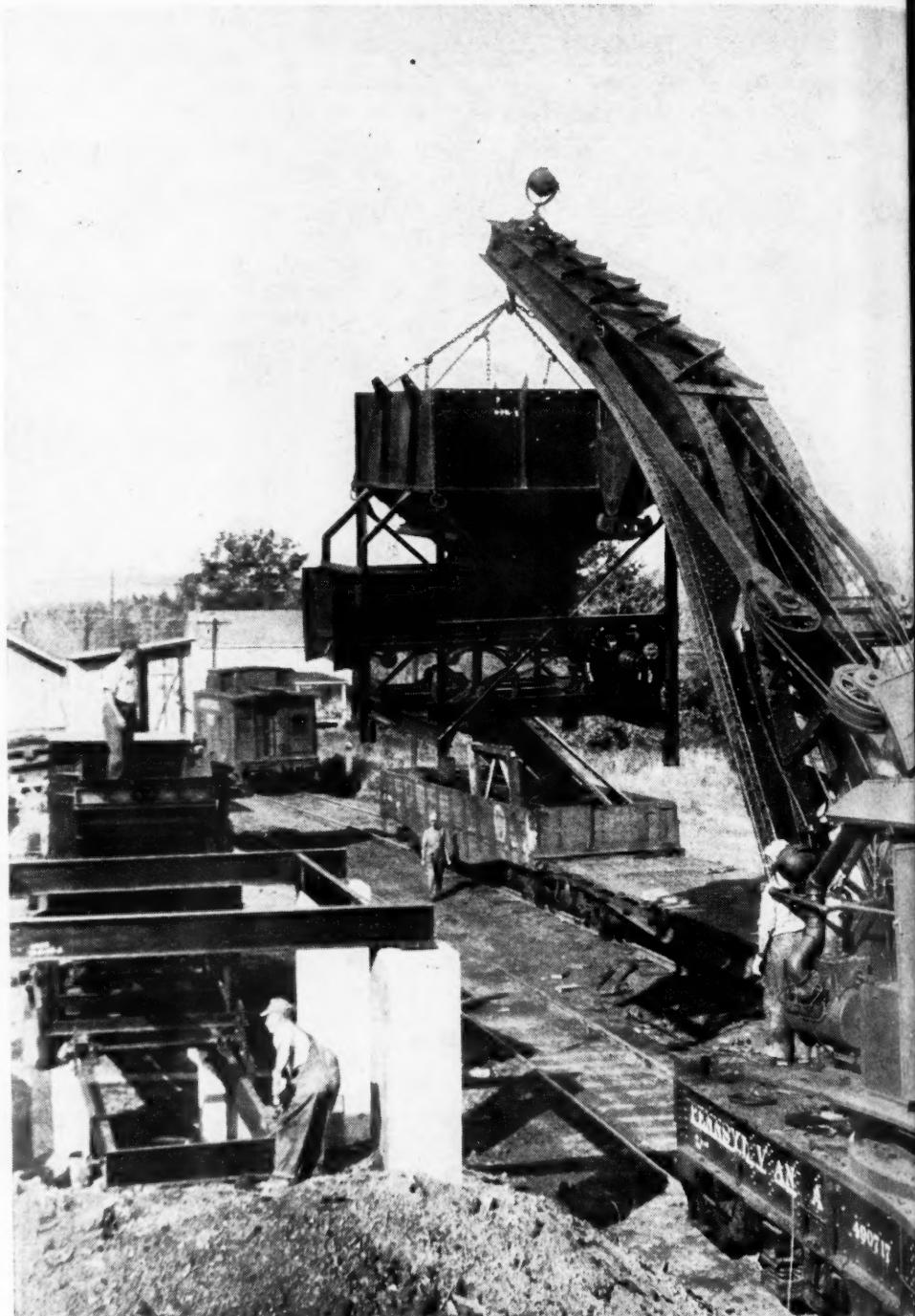
1. Hopper section, 20 ft. high, into which the trucks dump at the top of an inclined ramp. This section also carries a 42-in. reciprocating feeder and the necessary chain drives.

2. Housed-in center section which carries a 10-ft. section of reciprocating screen with $\frac{1}{2}$ in. perforations (Hendrick lip screens), a slate picker's chute and slate bin, a 24x42-in. Bantam Buster crusher crushing to $2\frac{1}{2}$ in., and a Type D 4600 665-hp. six-cylinder Caterpillar diesel engine with 12 Type C-120 Gates V-belts. All drive chains are 14-in.-pitch Diamond roller chains.

3. The inclined section of the flight conveyor which elevates the coal 28 ft. above the ground where it is released into a 3-ft.-wide loading chute, running at right angles to the conveyor, which empties into the railroad car.

Several times a day when the plant happens to be waiting for coal from the pits and also at the end of the shift the rock bin is emptied. A gate releases the rock and it falls onto the flight conveyor where it is elevated in the same manner as the coal. However, when it is released into the loading chute, it slides about half-way down where another gate directs it into a back chute from which it falls into a truck and is carted away.

Coal from the Miller B, or Lower Kittanning, seam marketed as Cooper Smokeless No. 2 from the north pit, three miles distant, and Militant Smoke-



A railway crane was enlisted to help erect the three-section plant.



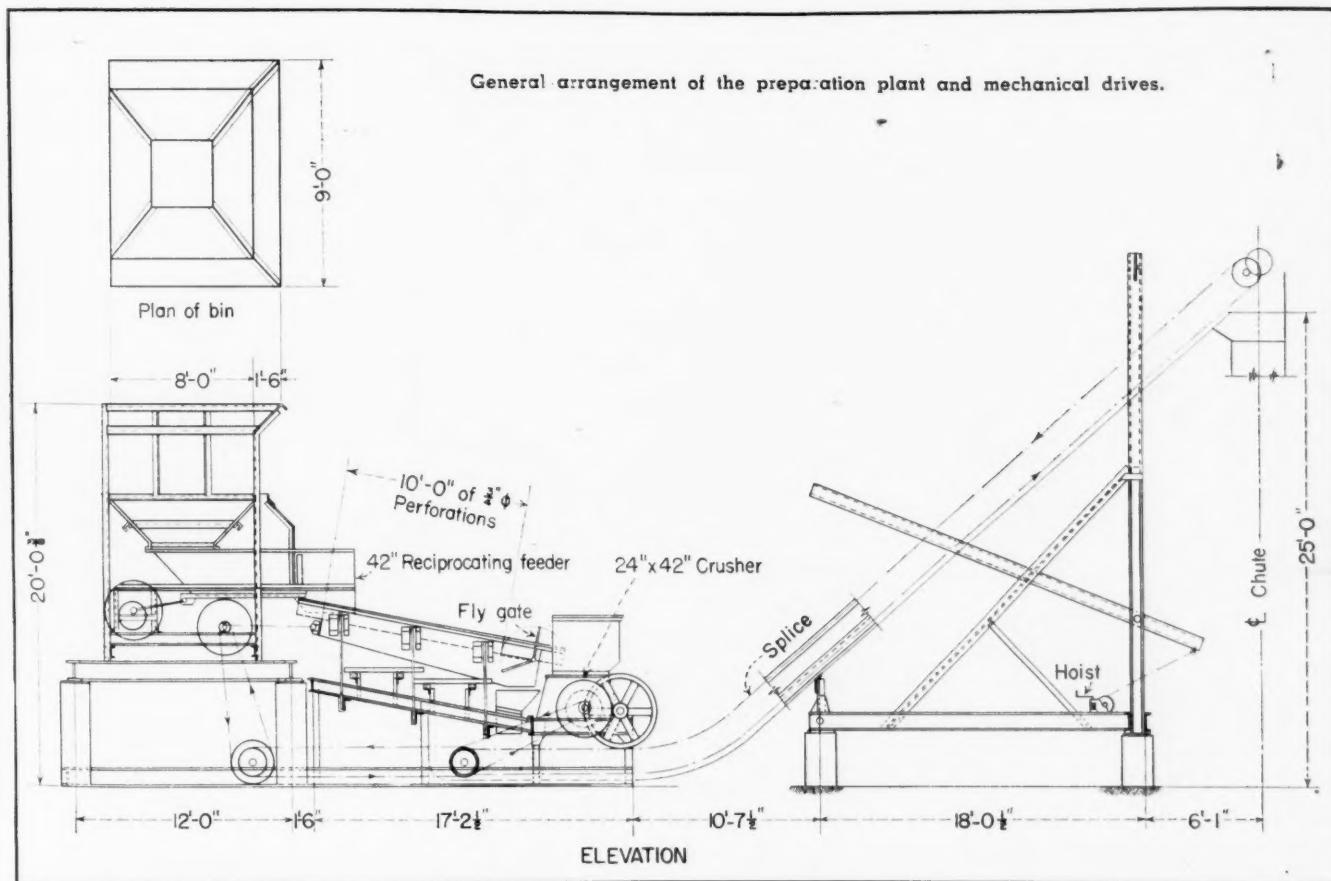
Coal on the way through the semi-portable preparation plant. At the close of the day the end of the loading chute is raised to permit the switching of railroad cars.

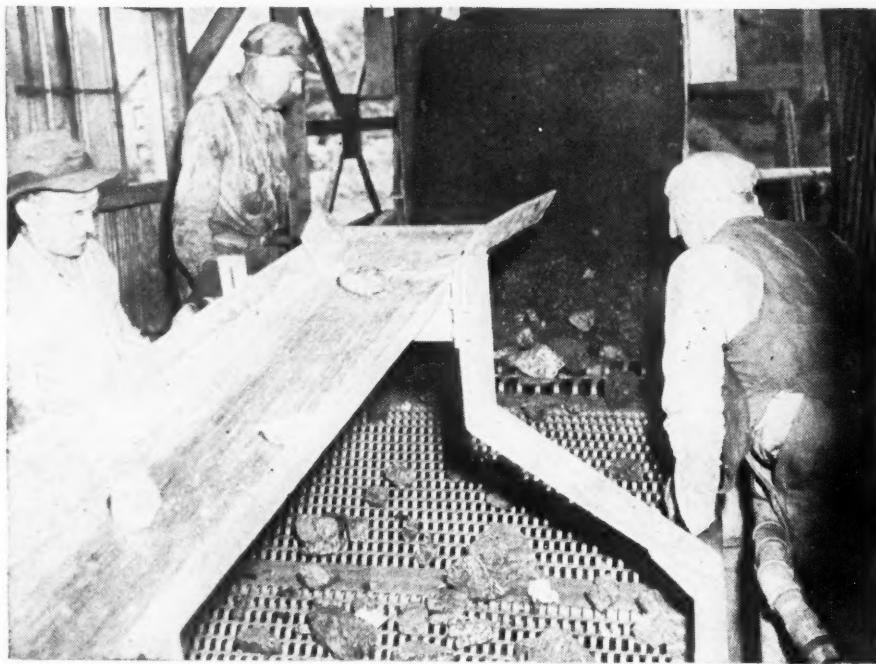
less from the south pit, six miles away, reaches the preparation plant by truck, 6 to 8 tons to the load. Each load is weighed, backed up the ramp and discharged into the hopper. A supervisor and five men operate the plant which has a capacity of 800 to 1,000 tons in eight hours. Three men pick slate. Coking tests are run constantly on the coal to make certain that the coal from both pits is blended to give a product that possesses good coking qualities.

Both open-pit operations are working hill-top coal deposits. At the north

operation, two Type TD-18 International tractors with Bucyrus angle blades work ahead of a Marion 40A 2½-cu.yd. stripping shovel. This shovel has a 45-ft. boom and a 36-ft. dipper stick. Cover for the 28- to 30-in. seam ranges up to 40 ft. Prior to the gathering of the material for this article, shale was the hardest substance found in the overburden. For drilling and shooting it a Model SM4C4 Parmanco drill with 6-in. augers and Atlas or Hercules 4x16-in. 40 percent explosive detonated with electric caps were used. Since then, 3

Much of the overburden can be moved without being shot.





Three men watch for slate and rock passing over the screen. Above and attached to the screen is the slate chute.

to 4 ft. of blue sandstone has been encountered just above the coal but it is expected that vertical drilling will be the solution to this problem.

Much of the coal is columnar in structure with highly colored pieces of "peacock" coal scattered throughout the bed. The coal, without being shot, is loaded into trucks by a Lorain 80 1½-cu-yd. shovel equipped with a 23-ft. boom and 20-ft. dipper stick. Two men work on the ground with this shovel to facilitate the cleaning up of the loose coal. When there is a delay between trucks the shovel operator scoops coal and piles it ahead on the seam, making the loading of the trucks faster after they arrive.

Drainage is not much of a problem. Once the water is pumped over the spoil bank from the pit it flows away by gravity. The management is pleased with the operation of a 500-g.p.m. (200-lb. pressure) Howe fire-fighting unit used to keep the pit dry. This portable, gasoline-powered centrifugal pump, with a 6-in. suction and two 3-in. discharge hoses, was purchased recently from the U. S. Office of Civilian Defense.

At the south operation, where the



This 3½-yd. dragline is smoothing out a ramp to move down.

Bulldozers work ahead of the stripping shovel.



seam is 30 to 34 in. thick, the stripping and loading is done by the Penbrook Contracting Co. under the field supervision of Harold Owens. As much as 45 ft. of overburden overlays the coal and it is removed by Cletrac tractors with Heil blades and a 1201 Lima dragline equipped with a 90-ft. boom and a 34-cu.yd. Esco bucket. Usually, the last 25 ft. of the overburden must be shot. To do this, 6-in. holes on 25-ft. centers are drilled 60 ft. horizontally into the highwall 3 ft. above the coal. Each hole is charged with 250 to 300 lb. of Atlas Apex 5-in. by 25-lb. explosive.

The coal is shot to facilitate loading with a Lorain 40 3/4-cu.yd. shovel equipped with an 18-ft. boom and a 16-ft. dipper stick. Of the 20 trucks

hauling coal to the preparation plant from both open-pit operations, only two are company owned. The rest are contracted for on a tonnage basis. Except for about 1½ miles leading away from each pit, which is down grade for the loads, all of the highway roads used for trucking the coal into Bigler are black top or concrete.

In the company's New York office (114 Liberty St.) are: C. O. Fowler, general sales manager, and Walter Keenan, consulting engineer. The operating and supervisory staff at Bigler is as follows: R. S. Walker, general manager; C. E. Morris, assistant general manager; R. B. Hutchinson, coal sales manager; C. P. Saupp, operations engineer; and D. C. Penoyer and John Morris, foremen.

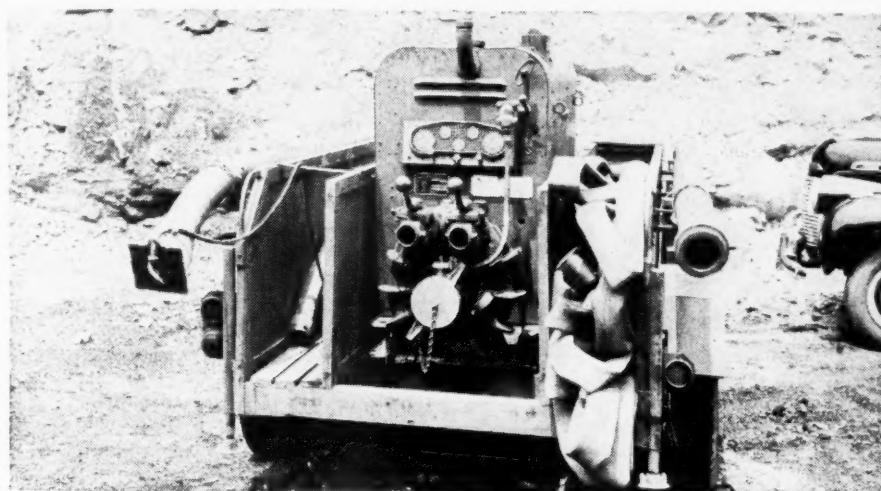


R. S. Walker is general manager for the Bradford Coal Co.'s operations in Clearfield County, Pennsylvania.



John Morris manages the operation of the preparation plant.

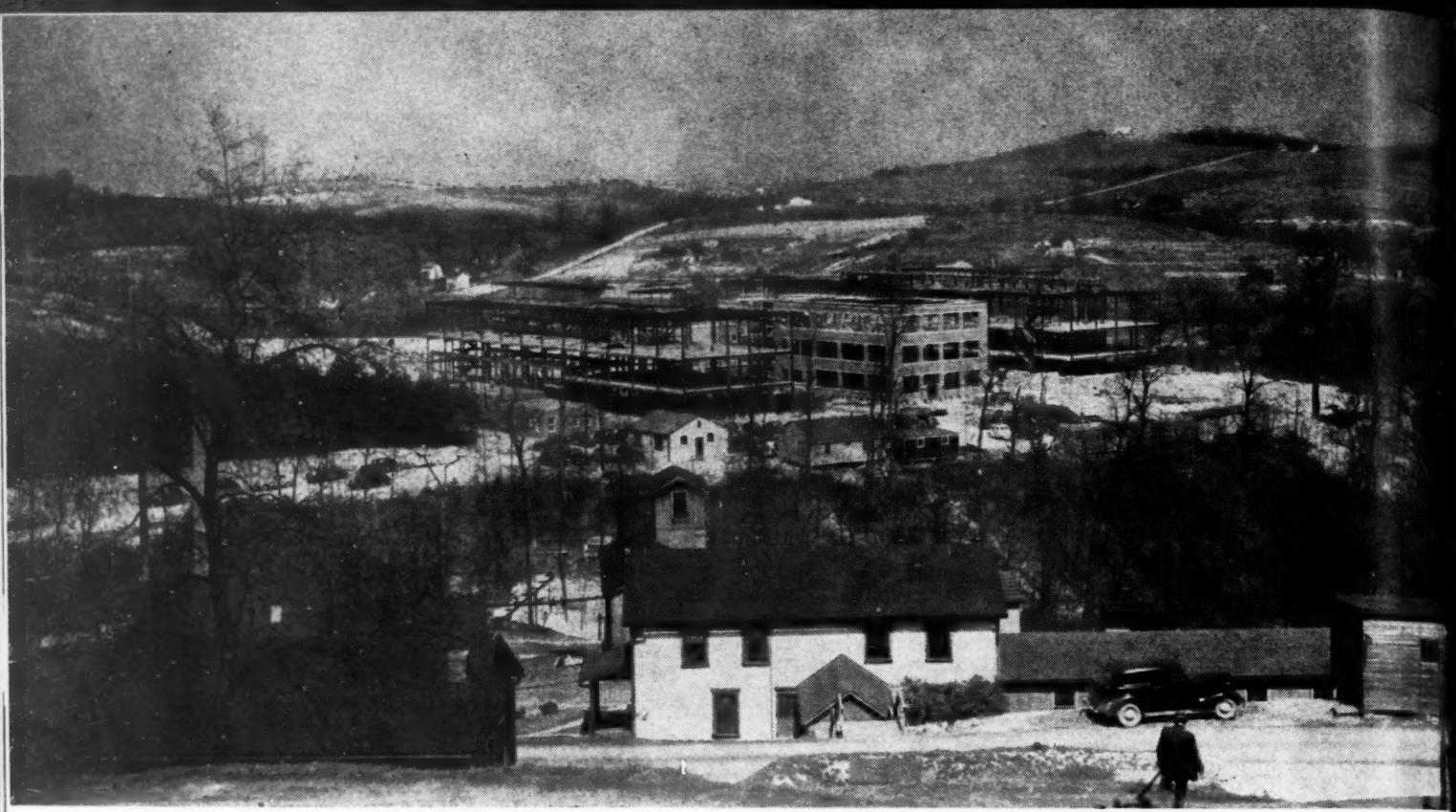
D. C. Penoyer supervises the north open-pit operation.



This 500 g.p.m. pump with two 3-in. discharge lines, formerly used as Civilian Defense fire-fighting equipment, keeps the pit dry at the north operation.

The seam being loaded in this cut at the north operation measures 28 to 30 in.





General view of the synthetic-liquid-fuels laboratory at Bruceton, Pa., primarily devoted to work on coal. The new buildings are (left to right), the gas-synthesis unit, warehouse and hydrogenation unit. (Bureau of Mines photo.)

OIL FROM COAL NEARER As Development Work Gathers Momentum

Two Laboratories and Demonstration Unit for Synthetic Liquid Fuels Nearing Completion—Second Demonstration Plant Under Way—U.S. Benefits from German Secrets—Cost Trend Downward as Problem Is Studied

By Hon. Jennings Randolph
Second District—West Virginia
House of Representatives
Congress of the United States
Washington, D. C.

SUBSTANTIAL STRIDES toward the establishment of an American synthetic-liquid-fuels industry are evident as scientists of the Bureau of Mines, aided by the industrial and laboratory secrets of a decade or more of German experience, reach the end of the second year of a five-year program devoted to synthetic fuels research and development—an activity momentous to the national welfare and of particular significance to the coal industry.

Despite labor and material problems, two laboratories and a demonstration

unit are nearing completion and the conversion of a wartime ammonia factory into a second synthetic-fuels demonstration plant is under way. The oil shale research and development laboratory at Laramie, Wyo., is scheduled to be ready for occupancy this fall, and the oil-shale demonstration plant at Rifle, Colo., is expected to be in operation by the end of the year. It is anticipated that the laboratory and pilot plant at Bruceton, Pa., will begin making synthetic oil and gasoline from coal early in 1947. Contracts have been let for converting the surplus synthetic-ammonia plant at Louisiana, Mo., into a coal-hydrogenation and gas-synthesis demonstration plant. Meanwhile, Bureau technicians, working in temporary quarters with limited facilities, have reported important research advancements.

The objective of the synthetic-fuels program is to point the way for private industry in a field that appears destined to become one of the largest industries of the future, perhaps employing hundreds of thousands, aiding in the conversion of surplus war plants, mushrooming coal production and constituting a guarantee that the United States will never become a "have-not" nation with respect to liquid fuels—the oil and gasoline on which our domestic economy, our armed services, are dependent.

To attain this objective, the Synthetic Liquid Fuels Act provides for necessary laboratory research and pilot-plant work, engagement of consulting engineers and chemists from industry, acquisition of patents, if needed, and, finally, the erection and operation of demonstration plants to produce gasoline and oil from

coal, lignite, oil shale, agricultural and forestry products and other substances.

Cognizant of the immense wartime withdrawal from our irreplaceable petroleum reserves and their effect on the future economic and military security of the United States, Sen. Joseph C. O'Mahoney, of Wyoming, and myself introduced in 1943 the legislation authorizing the Bureau of Mines to undertake this program of development of supplementary sources of liquid fuels. During August of that year, extended hearings were held in Washington, Pittsburgh, Salt Lake City and Sheridan, Wyo., by a subcommittee of the Senate Public Lands Committee under the chairmanship of Senator O'Mahoney. I was chairman of the subcommittee of the Committee on Mines and Mining of the House of Representatives, which conducted hearings in June and July of 1942 on this subject. At Senator O'Mahoney's invitation, we collaborated in the hearings to explore the country's position with respect to petroleum reserves and the possibilities of meeting shortages through the utilization of coal and other raw materials for the production of synthetic liquid fuels. This legislation became Public Law 290 (78th Congress) and appropriations to conduct the program were made available on July 1, 1944.

Government Funds Approved

At this writing, the 1947 appropriation act for synthetic-fuels work and other functions of the Department of the Interior is under consideration in the Congress. Last year, the Congress reaffirmed its mandate for the Bureau to improve and adapt synthetic-fuel production processes to American raw materials by setting aside \$7,000,000 for the work in the 1946 fiscal year. In addition, a contractual authorization of \$15,000,000 was granted for the construction of new laboratories and demonstration plants and purchase of equipment. An initial appropriation of \$5,000,000 had been made for 1945 to carry out the provisions of Public Law 290, which authorized a total expenditure of \$30,000,000 for synthetic-fuels research and development over a five-year period. This year, the House Appropriations Committee trimmed a request for \$7,000,000 to \$3,500,000. The bill was passed by the House and sent to the Senate without change in the synthetic-fuels appropriation. If the curtailed funds are not restored by the Senate, the Bureau will be compelled to obligate funds under last year's contractual authorization which has not been used as yet.

Appropriately, the primary emphasis of the synthetic-fuels program is cen-

tered on coal, because the United States, including Alaska, possesses some three trillion tons—more than half of the known coal reserves of the world. Still virtually untouched, these vast beds are estimated to be sufficient to supply all of our gasoline and oil—in addition to other coal requirements—for the next thousand years. This does not mean, however, that the supply of all ranks of coal is ample for all purposes. Coal of coking grade, particularly with low sulfur content, is not overly abundant and it should be conserved for metallurgical use. Fortunately, lower-type coals are satisfactory for the production of oil and gasoline. In fact, they are preferable in some processes. In addition, the low-scale coals frequently are available in thick beds near the surface where low-cost strip-mining operations are possible, an important factor in achieving low production costs for synthetic liquid fuels.

As the Nation's greatest reserve of latent energy, coal supplies more than half of the annual energy requirements of this country. Although a rapid increase in the use of petroleum, natural gas and water power has reduced the percentage of energy supplied by coal from about 90 in 1900 to about 52 percent in 1940, the pendulum doubtless will swing back to coal as supplies of oil and gas from natural reservoirs diminish.

The oil-shale reserves of the United States are extensive, but they do not compare with those of coal. Largely concentrated in the Rocky Mountain states, these deposits are estimated to contain 92 billion barrels of recoverable oil or roughly between four and five times the proved petroleum reserves of the country and enough to supply our liquid fuel needs for more than a half century. The problems involved in the cheap production of oil and gasoline from oil shale largely are those of han-

dling huge tonnages of material at low cost. The shale beds are thick and by the development of proper mining techniques it should be possible to achieve low mining costs. Similarly, retorting operations must be so conducted to keep at a minimum the cost per ton of material handled.

Natural gas is another potential source of liquid fuels, but the reserves, totaling about 100 to 125 trillion cubic feet, will last only 30 to 40 years at the present rate of consumption and substantially less if used also to make oil and gasoline in large volume. Natural gas can be converted to liquid fuel more cheaply than either coal or oil shale, but this resource has not been included in the Government's synthetic-fuels program because of the limited reserves and because private industry's research on this problem already is far advanced—so far, in fact, that one company has announced plans to build and operate a plant.

Agricultural Products Usable

Agricultural products offer an essentially unlimited source of raw material for the production of synthetic liquid fuels. Except in unusual circumstances, costs of producing these materials and transporting them to a central plant for processing would not appear as economical as the use of coal and oil shale, which are available in large quantities in relatively small areas. In certain localities, however, where huge quantities of waste agricultural products already are in existence, the processes for using these raw materials deserve consideration and are being explored by the Department of Agriculture through a transfer of funds from the Bureau of Mines.

The synthetic liquid-fuels program has been undertaken none too soon. At the unparalleled 1945 rate of consumption, our proved reserves of natural pe-



Missouri Ordnance Works, near Louisiana, Mo., taken over by the U. S. Bureau of Mines for conversion to a hydrogenation and gas-synthesis demonstration plant for producing liquid fuels from coal and lignite.

petroleum would last only some 12 years, an alarmingly short time for a commodity of such vital importance to our national security and to our everyday life. Furthermore, our 12 years of proved supplies will take 40 or 50 years to recover and, therefore, the quantity available from this source is certain to fall short of requirements in the no longer distant future. Of course, more petroleum will be found, but new discoveries have been falling far short of withdrawals since 1937, even though more exploratory wells are being drilled than ever before. Reserves in new fields discovered in 1937 amounted to 74 percent of the production in that year. In 1945, although exploratory activities increased to about four times their normal level, reserves in newly found fields were only about 11 percent of the production.

Despite this decline in new discoveries, estimates of proved reserves have shown some increase. For example, the estimate of proved reserves increased from about 20½ billion barrels on Jan. 1, 1945, to about 21½ billion barrels on Jan. 1, 1946, or less than 3 percent. The explanation of this apparent paradox lies in the fact that the major additions

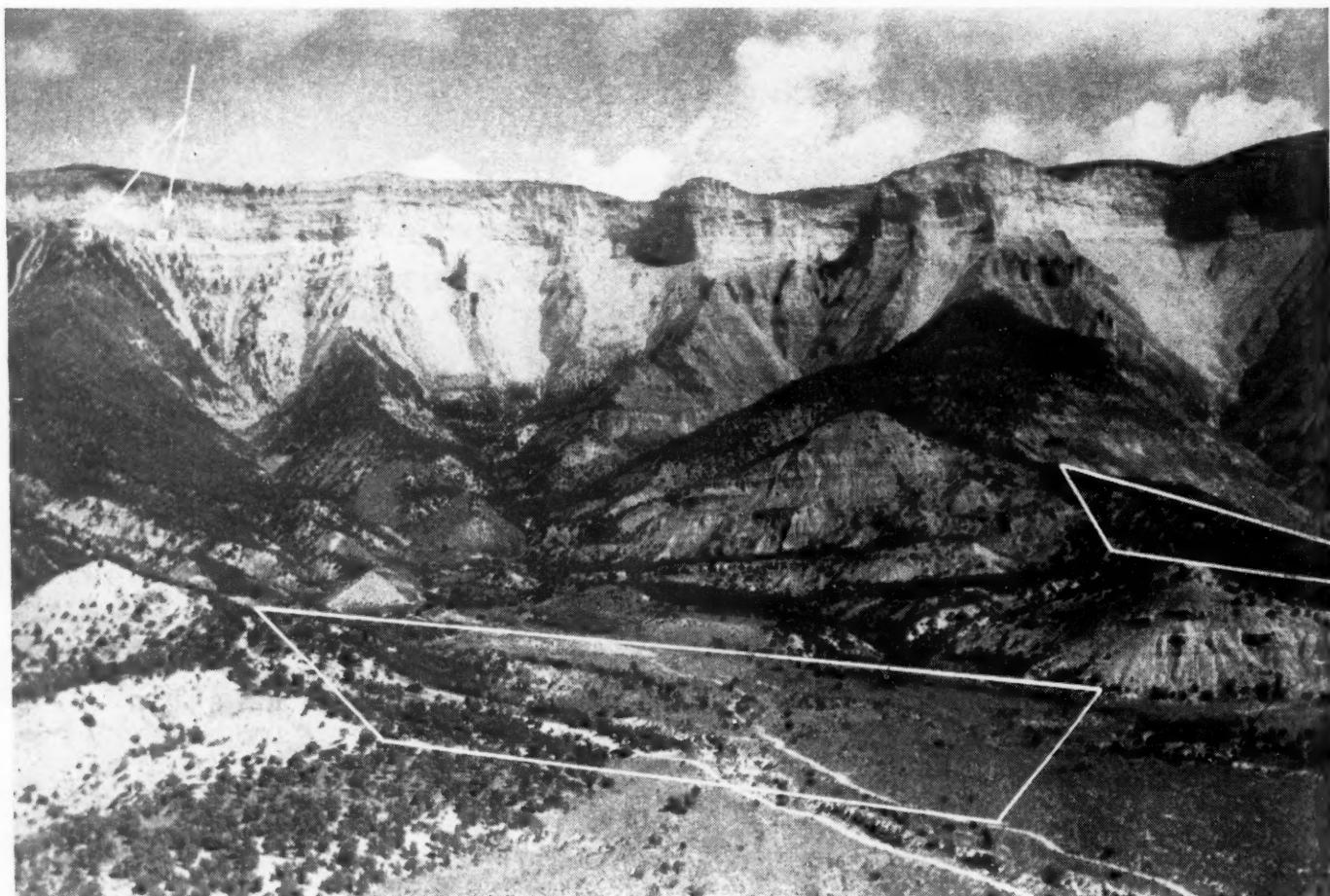
to estimates of proved reserves now represent extensions and revisions of estimates of the content of old fields. Requirements for 1945 were met, however, only by withdrawing oil from some pools at excessive rates that probably reduced ultimate recovery. It is obvious that unless the downward trend in new discoveries is arrested—and there is little reason to believe that it will be—the country cannot hope to meet current petroleum demands from domestic resources for more than a few years.

Fortunately, the war ended in 1945 and heavy demands for petroleum dropped sharply. It is already evident, however, that the military need is being replaced by increased civilian use and that by 1950, or shortly thereafter, our normal demand for petroleum products will exceed the maximum usage during the war years. This means that the country must be prepared to produce continuously petroleum in immense quantities.

Estimated at slightly more than 21 million barrels, the petroleum reserves of the United States would fill a tank the size of the District of Columbia to a depth of 50 ft. This, admittedly, is a lot of oil—more than the proved re-

serves of any other single country. But in the United States, an average of one well has been sunk for every three square miles, whereas in foreign countries only one well has been drilled for every 500 square miles of land area. Then, too, the average new oil field now being found in the United States contains not more than two million barrels, while the 300 new fields found abroad in the last two decades have had an average estimated ultimate production of 100 million barrels each. These figures indicate clearly that the bonanza days of big oil discoveries may be over for the United States and that they are under way for less progressive countries where mobile economies are yet to be extensively developed. The importation of petroleum is, of course, a factor to be considered. In our plans for the immediate future we are even now dependent on supplies of foreign oil. If the prospect of importing oil were suddenly ruled out, our situation would be desperate indeed.

However, if we continued to depend on imports and neglected the production of synthetic fuels, we might find ourselves in a predicament far worse than that prevailing when our supplies



Oil-shale project near Rifle, Colo. The demonstration-plant site is at the right; camp site, center; and the ridge leading to the mine portals, left. The cliff face and talus slopes are oil shale. (Bureau of Mines photo.)

of crude rubber were cut off after Pearl Harbor was attacked. The tonnage of liquid-fuel requirements is vastly greater than that of rubber. On the other hand, the normal stocks of liquid fuels on hand, adequate for a few days or weeks and a limited mileage at most, are trifling when compared with our reserves of rubber.

Oil Supply Uncertain

Since peace was restored, it has become evident that oil will continue to be one of the main points of contention among nations. We cannot be certain that oil always will be available to us from the large reserves in the Persian Gulf area or even from the closer sources, such as South America. We can be cut off from these sources of supply, as was shown by the temporary U-boat blockade of our coastal-tanker routes during the war. In addition, as these resources are not under our control, we have no guarantee of the quantity that will be available to us or the price that we will be forced to pay.

We cannot survive a prolonged famine in liquid fuels. We must not rely on uncertain foreign sources. In the interest of national security, it is imperative that an American synthetic-liquid-fuels industry be established as soon as possible, before our petroleum is gone, before another national emergency.

Even though the need to produce all or even the bulk of our liquid fuels from coal and oil shale does not come for many years, the staggering proportions of the synthetic-fuels industry that will have to be built requires that a construction program begin at the earliest possible moment.

By way of illustration, let us assume that 20 years hence annual consumption of petroleum—now 1.8 billion barrels—will have risen only to two billion barrels; that, through large new discoveries and extensions of known fields, the petroleum industry still will be able to produce a billion barrels a year; and that the balance of requirements will be produced synthetically. Let us assume further that industry will start construction of the plants needed to produce the billion barrels of synthetic fuels on completion of the five-year program of the Bureau of Mines and will build the plants at a uniform rate for the remaining 16 years. Then, according to testimony presented by representatives of private industry at Congressional hearings on the synthetic-liquid-fuels bill, the construction program would require a million tons of steel a year and an investment of \$1,000,000,000 for each of the 16 years. The total expenditure would be roughly equal to the invest-

ments and assets of the entire petroleum industry, plus the synthetic-rubber plants.

Although it is anticipated that the research and development work of the Bureau of Mines and private industry will appreciably reduce the steel requirements and equipment costs and that much of the refining capacity of the petroleum industry can be converted to synthetic fuels, it is obvious that such a construction program would be immense. In addition, numerous new mines would have to be developed and old ones expanded to provide the raw materials for the new industry. To produce a billion barrels of synthetic oil, about a billion tons of coal, lignite and oil shale would be required, or a quantity approximately twice the 576 million tons produced in 1945 by the bituminous industry. Furthermore, establishment of a synthetic-fuels industry may help solve the problem of surplus war plants, because some of them, such as the synthetic-ammonia plants, can be converted to produce liquid fuels.

Victory in Europe aided the synthetic-liquid-fuels program materially. Bureau of Mines engineers and chemists, who followed in the wake of our troops, had a free hand in studying what Allied bombs left of the famous synthetic-oil plants that fueled Germany's Luftwaffe and Wehrmacht. Collaborating with the British, the Bureau's technicians and others from the Petroleum Administration for War and private industry traced down secret German records and obtained formulas and samples of catalysts used by the Nazis in producing annually from coal an estimated 40 million barrels of synthetic oil and gasoline.

German Methods Adapted

Some of this information is not applicable because of the differences between German brown coal and American lignite and subbituminous coal, but the German experience and technique is aiding in the development of suitable processes for our low-rank coals and thus saving time. Despite Germany's long head start on synthetic fuels, some process refinements now being worked out by American scientists are believed superior to any employed in the fallen Reich. For example, laboratory-scale development is now in progress on a very efficient gas-synthesis converter using only about 10 percent of the steel required by the German converters. However, the diesel oils made synthetically in Germany are better than those our Navy is using and the Bureau of Mines plans to produce and supply the Navy Department with

the limited quantities of these and other synthetic fuels needed for research activities of the Bureau of Ships.

Unfortunately no accurate figures are available on the cost of producing synthetic gasoline on a commercial scale from this country's coal, lignite, oil-shale or agricultural materials. However, estimates have been made ranging from 12 to 25c. a gallon. Improvements certain to come from research by the Bureau of Mines and private industry will reduce costs drastically. But even assuming that these efforts do limit the basic production cost to 12c. a gallon by the time the first commercial plant is constructed, it still would be 7c. higher than the present cost of ordinary motor fuel or nearly as much as that of 100-octane aviation gasoline, which is about 14c. a gallon at the refinery.

Exact Costs Essential

Whatever the cost, it must be known exactly. Estimates are not enough when the construction of new plants and the founding of a new industry is under consideration by private capital. The Bureau of Mines has been charged with the responsibility for providing this information as well for dealing with technical phases of the problem.

During the first two years of the program, the Bureau organized an Office of Synthetic Liquid Fuels and engaged about 400 employees, including a number of the country's foremost experts in this field. Research and development work on the production of oil and gasoline from coal is centered at Bruceton, Pa., and Morgantown, W. Va., and, under present plans, demonstration work utilizing coal will be conducted at Louisiana, Mo. The research and development activities will be confined to pilot plants not exceeding a production of more than a few barrels of oil a day, while each of the two demonstration plant units at Louisiana, Mo., will have a capacity of about 200 bbl. a day.

Seeking improved processes and reductions in operating costs and size of equipment, the work at Bruceton will be devoted to testing new scientific developments and new engineering designs, as well as to determining the best methods of treating American coals. Here, the Bureau will install two 1-bbl.-a-day gas-synthesis pilot plants, three experimental coal-hydrogenation pilot plants with a capacity of about 10 gal. a day and laboratory-scale research apparatus for development of both processes. The six buildings and the oil tanks, gas holders, coal bunkers and other equipment will occupy a 12-acre area. Larger pilot plants, possibly up to a 10-bbl.-a-day capacity, may be installed later if such plants prove necessary for

the design of the 200-bbl.-a-day demonstration-plant units.

Pending completion of the new laboratory and pilot plants at Bruceton, research is being carried on in temporary laboratories in nearby Pittsburgh, where the Bureau has been investigating coal liquefaction on a small scale for several years. So that no time would be lost while the new facilities were being designed and built, 5,000 sq.ft. of additional laboratory and office space were obtained at the Bureau's Central Experiment Station by building a mezzanine floor in a building designed to house mine-rescue cars. The research staff was increased and modern new equipment installed, including X-ray diffraction apparatus, infra-red and mass spectrometers, a magnetic balance, precision distillation apparatus, catalyst-testing units, synthesis-gas generators and converters embodying new principles. Several hundred catalysts, including many from Germany, have been tested, an exhaustive survey of technical and patent literature on processes is in progress and specifications and plans are being drawn for the coal-hydrogenation and gas-synthesis demonstration plants.

Pilot Plant at Louisiana

At Morgantown, W. Va., a gas-synthesis laboratory recently was established on the campus of the University of West Virginia in buildings made available by the institution. Problems of briquetting and coking, gas making and gas treating and testing are under study there. Information acquired will be applied in the design of pilot-plant and, later, demonstration-plant gas-making equipment at Louisiana, Mo.

The \$17,500,000 Missouri Ordnance Works, near Louisiana, Mo., which was taken over under an agreement with the War Department, made synthetic ammonia during the war. Much of the existing facilities and equipment can be used with little modification for synthetic-fuels demonstration work, saving several millions of dollars. Synthetic-fuels plants in England—and formerly in Germany—frequently are operated in connection with synthetic-ammonia plants to obtain the most efficient use of raw materials, plant and personnel. The ammonia plant property includes 390 acres of land of which 90 acres are fenced.

The initial contract for conversion of one section of the plant to a coal-hydrogenation synthetic-fuels unit has been awarded and construction is beginning. A gas-synthesis unit will be added later. These demonstration-plant units will provide the technical engineering data needed by industry for the design

of full-sized commercial plants and the information for calculating production costs under American conditions. As it obviously is undesirable to erect costly demonstration plants to exhibit processes which have been used for a decade or more in Germany and other countries, adequate time is being provided to develop and incorporate improvements before final designs for the demonstration units are chosen. Both demonstration units will be established at the Missouri site to avoid duplication of facilities, such as offices, laboratories, boiler and power plants, water and sewage-disposal systems, machine shop and repair facilities, railroad spurs, coal-handling and storage provisions, roads, parking lots and cafeterias. Operating costs also are thus minimized, because supervisors, power-plant operators, watchmen, mechanics and office workers can serve two such units without a material increase in number over those required for one.

The plant site—less than 100 miles above St. Louis on the Mississippi River—is within easy reach of the major coal fields of the United States. Coals from all of the larger fields will be tested and utilized in the demonstration plant.

Two processes have been developed for converting coal to oil and they are entirely different in the way the conversion is approached and in the character of products that result.

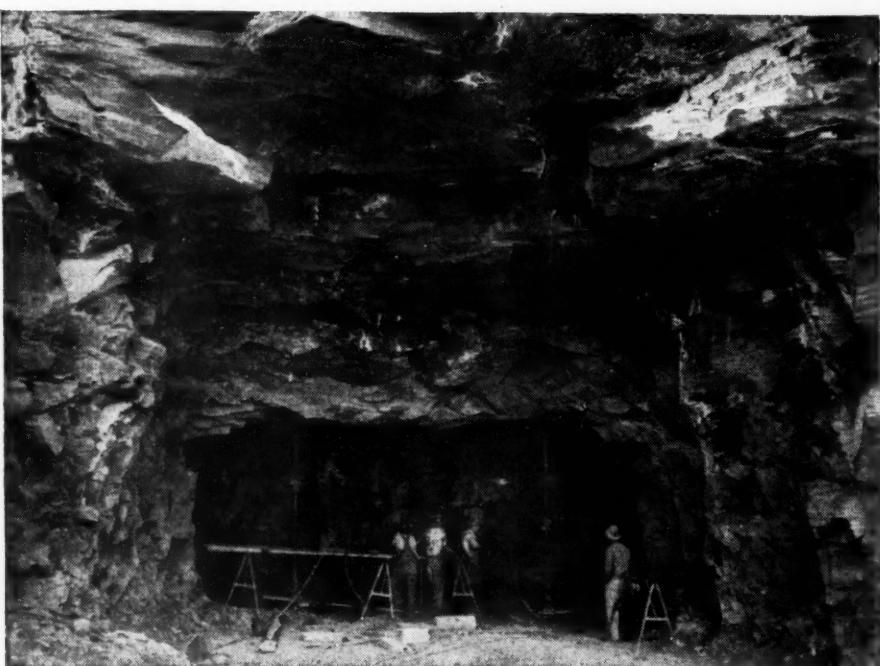
Briefly, in the direct hydrogenation process, coal or lignite is converted to oil or gasoline by forcibly combining it with hydrogen under high pressure with

the aid of a catalyst to promote the reaction. Production of a barrel of gasoline requires 0.6 tons of bituminous coal, 0.9 ton of subbituminous coal or 1.2 tons of lignite. In the indirect gas-synthesis process, the coal or other combustible material first is gasified to produce hydrogen and carbon monoxide. Then the purified gas containing the proper proportions of these two components is passed over a catalyst which causes the gases to combine, forming oils and waxes. A barrel of motor fuel can be obtained from 0.7 ton of bituminous coal by the process.

Process Not Yet Competitive

It is probable that gasoline could be produced at a cost of from 12 to 18c. a gallon in a large hydrogenation plant using low-cost coal and having a high degree of automatic control. This cost, of course, is not competitive at present with that achieved in obtaining motor gasoline from petroleum. On the other hand, however, gasoline from this process has a high octane rating and good rich-mixture performance, and can be converted to aviation-quality gasoline at costs only slightly higher than the cost of synthetic motor gasoline. Coal hydrogenation may have a better opportunity of competing in the high-octane rather than the motor-gas field.

In the gas-synthesis process, which begins with a gasification step, coal reacts with air and steam or with oxygen and steam to produce carbon monoxide and hydrogen. These gases, when com-



Drilling in the lower adit of the oil-shale mine near Rifle, Colo. Oil shale is tough, hard to drill and difficult to break with explosives. Methods of mining shale on a large scale at a low unit cost must be developed. (Bureau of Mines photo.)

bined over a catalyst, yield light oil, diesel oil and wax. Unlike the coal-hydrogenation process, the product tends to have a relatively low octane value but will yield diesel oil with a very high octane value. This process also will yield a wide variety of chemical products, including higher alcohols for detergent use, lubricating oil, synthetic soaps, synthetic edible fats, paraffins, isoparaffins and, even, aromatic compounds. The products obtained are determined by the composition of the catalyst and the temperature and pressure of operation.

In using the gas-synthesis process, the Germans obtained volume production by employing an enormous number of small equipment units. However, the German application of the process was limited by their failure to solve the problem of heat removal from the catalyst surfaces where the carbon monoxide and hydrogen reacted to form the oil.

Production Units Enlarged

Rapid strides are being made by the Bureau of Mines and certain industrial organizations in developing methods for removing this reaction heat. In consequence, units of equipment having a capacity of several thousand barrels a day now are possible. In addition, catalysts have been developed that will permit the production of gasoline with an octane rating near 75 or other products with cetane ratings of 100. A diesel fuel with a cetane rating of 100 may be especially useful to the Navy and research is planned by the Bureau of Ships using synthetic fuels produced in Bureau of Mines plants.

Where natural gas can be obtained in this country at 4 or 5c. per thousand cubic feet, certain industrial organizations now estimate that synthetic gasoline can be produced for as little as 6 or 8c. per gallon. With further development of coal-gasification processes, gasoline may be produced from coal at a cost not much higher, providing the coal can be obtained at about \$1 per ton. The initial use of this process probably will occur in fields where coal is available at low cost from strip-mine operations.

Each phase of the Bureau's program is being conducted in close collaboration with industry. A synthetic-liquid-fuels technical advisory group has been appointed which is giving the Bureau invaluable assistance in attaining its objectives. It is composed of eleven outstanding chemists and engineers from industry, all of whom are authorities on petroleum and coal research.

Methods of producing oil from oil shale as well as from coal are being in-

vestigated as a part of the program. Oil shale is a sedimentary rock containing a solid organic substance known as "kerogen." When the shale is heated in a retort, the kerogen breaks down and yields an oil that can be refined into products similar to those obtained from petroleum.

At Laramie, Wyo., a research and development laboratory is virtually completed. Here, in temporary facilities, scientists are at work on laboratory and pilot-plant research relating to problems of mining, retorting and refining oil shale and its products. This is the first time that a comprehensive investigation of this nature has been conducted in the United States.

In the retorting investigations, full information is being collected on all the basic properties of the shale as a prerequisite to intelligent design work on retorts. Rapid progress is being made and most of the information needed will be available within a relatively few months. As crude shale oil does not have the same characteristics as petroleum, the refining problem is quite different in nature. Nevertheless, the refining studies are being undertaken in cooperation with the petroleum industry to bring its extensive knowledge of refining to bear. However, until a demonstration-plant retorting unit can be placed in operation to supply the necessary raw material, the refining studies cannot be conducted on an adequate scale.

Information acquired at the Laramie laboratory and from studies previously made by the Bureau of Mines is being applied in the design of a \$1,500,000 oil-shale demonstration plant being erected on the United States Naval Oil-Shale Reserves near Rifle, Colo. This installation, expected to have an ultimate production capacity of about 500 bbl. a day, will include a large shale mine, a seven-mile-long road to transport the shale from mine to plant by truck and a retorting and refining plant.

Oil-Shale Mining Studied

Mining and retorting the oil shale are the major immediate problems. Relatively little is known about mining American oil shales, but this may one day be an industry comparable to coal mining. It is known that rich oil shales are tough, hard to drill and difficult to break with explosives. The best methods must be determined and costs ascertained for mining the shale commercially on a large scale. In essence, the Bureau's plans call for an underground quarrying operation that should hold mining costs to a very low figure. The mine is being opened in a 70-ft. bed of shale averaging nearly 29 gal. of oil a ton. The

mining will be carried out in three benches, blasting down approximately 23 ft. in each. The entry is large enough so that a diesel-driven shovel and 15-ton diesel trucks can be taken directly into the mine for the loading operation.

Retort testing must be carried out with units of approximately full commercial size to obtain reliable information. At least two retorts of the N-T-U (Nevada-Texas-Utah) type will be installed to develop optimum-temperature and other information to serve as a "yard stick" for measuring the performance of other experimental retorts. When the most favorable types of retorts and best operating conditions have been determined through tests with a variety of American shales—rich to lean and strongly coking to non-coking—demonstration "runs" will be conducted to prove the processes in continuous operation and to provide data on operating costs.

Data Sought for Industry

A refining plant will be erected when a satisfactory process has been developed. Shale oil is unsaturated and simple distillation and cracking processes do not always yield a stable product. Refining facilities for shale oil must be designed not only for distillation and cracking but for removal or conversion of undesirable constituents.

When the synthetic-liquid-fuels program was initiated by the Congress, it was clearly understood that the Government was not to enter into competition with business. The objective then and now is for the Bureau of Mines to do the experimentation and demonstration work and to place the information acquired in the hands of private enterprise as soon as possible. With this "blueprint," private capital can and will establish a new industry to fill any need that may arise.

At the end of the five-year program, it is anticipated that the United States will have sufficient information for the production of oil from coal or oil shale on a full commercial scale. Information already acquired by the Bureau indicates that some synthetic-fuel processes can be improved to a point where their products may be nearly competitive with those of petroleum. How closely they approach costs in the petroleum industry depends on the success of the synthetic-fuels experimental work and the extent of any increase in petroleum costs occasioned by added exploration expenses and similar factors. Investigation and full development of synthetic-fuel technology offers the United States not only vast commercial possibilities but security with respect to one of the most essential commodities in its economy.



Punched master file cards are the basis of machine payroll work. This 90-column punch punches necessary data into the cards used in subsequent payroll and accounting operations.

PAYROLL WORK

Speeded by Modern Machine Equipment

Punched Cards and Tabulating Machines Reduce Labor and Make for Greater Accuracy in Preparing Payrolls—Cost Data and Various Government Reports Obtained as Byproducts in Machine Payroll Work

By **Jno. C. McNeil**
Certified Public Accountant
Wheelwright, Ky.

THE PAST TWO DECADES have witnessed great changes in mining methods, resulting in lower costs and greater production per man. These have come through mechanization of the

mines—the introduction of machinery to do a better job. Few concerns have carried this mechanization program into the office: they're still keeping the books by "pick" methods. Many of those who have mechanized the office have only partially mechanized it, using machines to prepare statements—good track, heavy motors on the main line but still gathering with mules.

There are three big problems in

the proper handling of mine payrolls:

1. Keeping an accurate account with the employee.
2. Rendering him a statement of that account.
3. Properly recording the operating costs.

These three results often are accomplished in devious ways and there are almost as many methods of doing so

as there are companies. Each one has its specially developed way of doing these things and practically all of them have so much repetition of work that a great deal of time is consumed in doing the job right.

The only successful answer is mechanization of the mine payroll. If this is properly done, the rendering of the statement and the recording of the operating costs are secured as byproducts of keeping the account. In addition to these basic requirements, a properly installed mechanical accounting system should provide other statistical data without any change in the set-up. Such widely unrelated data as "Reports of Absenteeism" and "Reports of Annual Earnings of Employees to the Bureau of Internal Revenue" should be secured from the set-up with equal facility. It should be possible to make the quarterly social security reports without re-writing and without the necessity of a lot of burdensome records to be added and re-added, checked and rechecked. Unless the system provides for all of these things, it is not properly installed. Such data should come as a byproduct of the bookkeeping operation and should not be made a separate bookkeeping operation.

Use Machine Designed for Job

Bookkeeping machines, like mining machines, have their limitations. No operator would think of attempting to load a mine car with an undercutting machine and yet they expect that very thing of bookkeeping machines. The result is that the accounting system is changed to meet the limitations of a particular bookkeeping machine so that, in the end, instead of a saving, they have only purchased a complicated method of doing the work. There are several reasons for this complicated set-up being put in. The average private accountant knows very little about the capacities and limitations of bookkeeping machines, and it also is lamentably true that the average professional accountant's acquaintance with them is limited to the knowledge that his bank statements come to him made up on machines and that Client Jones has "Accounts-Receivable" ledgers posted by machines.

There is only one successful answer to properly mechanizing coal-mine payroll accounting. That answer is the use of tabulating machines. Through no other method can such speed and accuracy be attained. No other method will produce as many byproducts of the posting operation as this method and through no other method can reports of employees' earnings to the Social Security Board, employees' with-

holding-tax receipts and like reports be obtained without re-writing from other records. The reports are always in absolute balance with an employee's payroll earnings because they are made from the same cards and there can be no error caused by the human element and because they are both machine made and not copied.

This article deals with tabulating machines as applied to coal-mine payroll accounts. Tabulating machines have been successfully applied in the steel industry, in the automobile industry and other industries where they have large payrolls. We are merely taking the methods used in these industries and applying them to the coal industry. There is no originality in the suggestions and the writer claims none. It is merely an adaptation of proven accounting methods to the coal industry.

Master File—A master file card is prepared for each employee, into which is punched his name, Social Security number and payroll number. This file card is the basis for all the other cards. It is punched on a 90-column punch shown in an accompanying illustration. This card is made in duplicate and is run through an "interpreter" which transcribes the information punched on the face of the card so that one copy may be filed numerically and the other filed alphabetically. The employee's check number should remain the same all through the quarter. The use of the master cards will be discussed later.

Posting Tonnage—The tipple sheet comes in with the weights totalled. A number of companies convert these weights into tons and carry forward the overweights to the next day. This is entirely unnecessary and the calculations can be made by changing the tonnage rate into a rate per hundredweight (dividing the tonnage rate by two and moving the decimal point over two places). When the tipple sheet comes in, a card for each employee is punched with the check number, weight and rate and the machine will extend each card. Where there is more than one rate per ton, the earnings for each rate have to be punched separately. This rate is locked into the machine and all that is necessary is to punch the check number and the weight. The machine will automatically extend each item and punch it at a rate of 1,200 extensions per hour and at the same time will produce a tape showing the transactions in order with a listing of the weights and rates and a total of the extensions. The account numbers on the cards (showing the account number to which the charge is to be made) can be punched on the 90-column

punch at the rate of 90 cards per minute. Therefore, if there are 1,000 loaders on the tipple sheet, the cards can be repeat punched with account number in approximately fifteen minutes.

An immediate question is: "What about overtime?" The procedure mentioned is for the five days in the week. The contract provides that one-ninth is to be added to the earnings of the loader for time worked on loading, yardage and day work (when worked in connection with loading coal), so before we account for premium pay for the loader it is necessary that yardage and day time be punched on his card.

Where hours (less than a full shift) are reported for loaders, the hours and money are punched on the card (the same one on which the tonnage is punched) in appropriate columns. The same is true of yardage, which is punched on the card. These cards are filed by days until the close of the half.

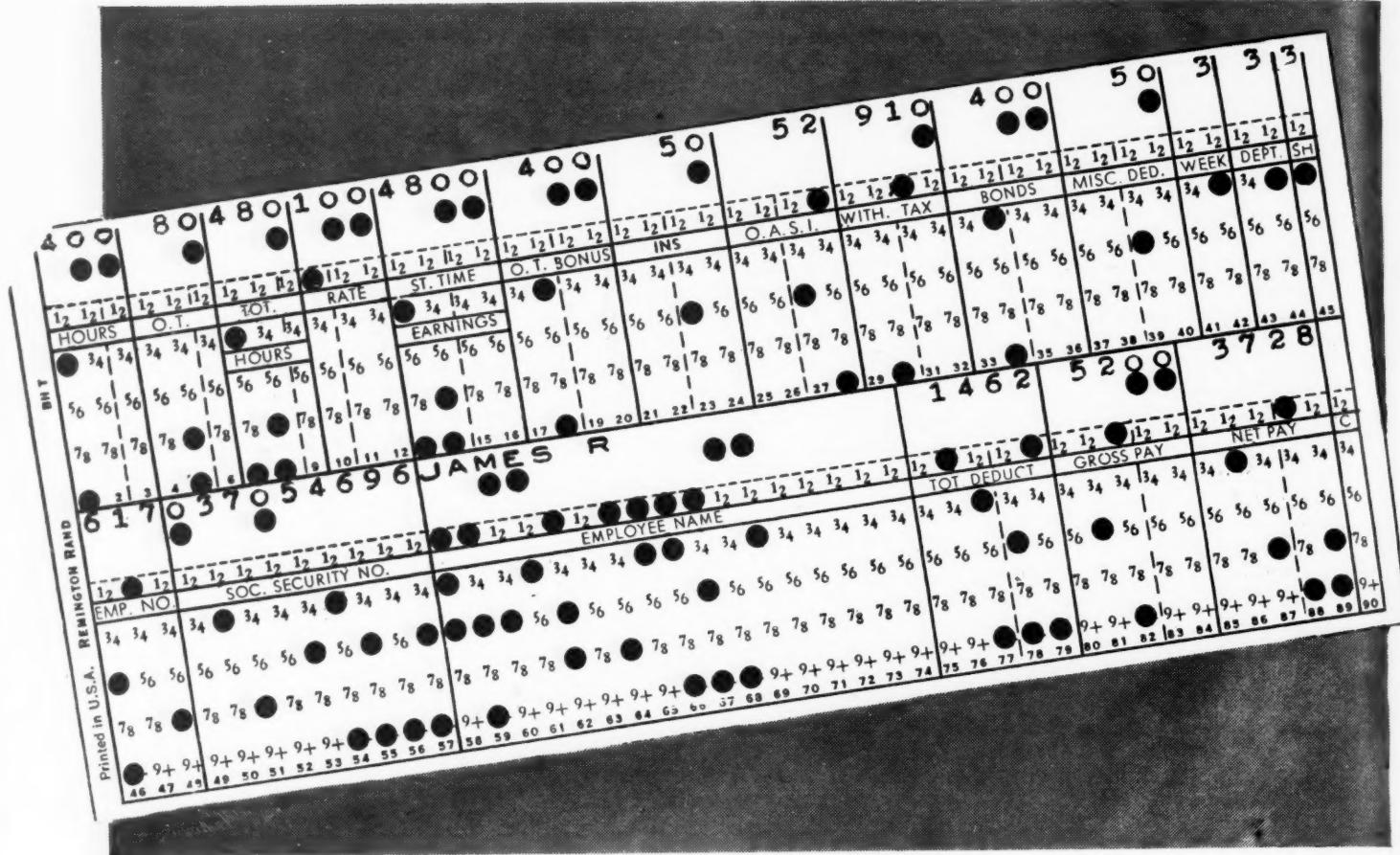
At the close of the half the cards are taken from the daily files and sorted into payroll numbers, grouping together all the cards for the 15-day period for each payroll number. This sounds like an impossible job or one requiring a lot of time or a lot of help, which it would be if the cards were sorted manually. However, the job is done on a counting sorter which will assort them into any desired order at a rate of 420 cards per minute.

The cards now are ready for tabulation and are tabulated by employees, giving an itemized statement of the number of tons and amounts earned each day at the basic rate. In the same operation, total tons, hours, amounts and the number of days worked are punched on the summary cards. A grand total of these amounts for all employees also is obtained.

To quickly calculate overtime and premium pay due loaders under the recent contract with the mine workers, the National Coal Association worked out a table of factors to be applied against basic earnings to arrive at premium pay. As the number of days is punched on the summary card, it is an easy matter to determine the factor applicable to overtime worked.

Through the use of the "Printing Multiplying Punch," it is possible to punch and extend the premium pay on the summary card and in the same operation obtain a detailed tape which shows the basic earnings and the total amount of the premium pay. From this figure and the grand total of basic earnings it is easy to arrive at the correct percentage of "make-up," or premium pay for the period, a statistic which comes as a byproduct of the posting operation.

Posting Time—As is well known to



Master file card as it comes from the machine punch. Used in sorting and tabulating machines, cards such as these reduce time and insure accuracy in payroll and costing work.

Form 88-1 b
TREASURY DEPARTMENT
INTERNAL REVENUE SERVICE
(Revised Nov. 1940)

**SCHEDULE A—EMPLOYER'S REPORT OF TAXABLE WAGES PAID TO EACH EMPLOYEE
CONTINUATION SHEET**

PAGE No. 2

Date Quarter Ended December 31, 1945

SPECIMEN

Type or print in this space employer's name, address of principal place of business, and identification number exactly as shown in Items 10 and 18 on Form 88-1 a

EMPLOYER'S ACCOUNT NUMBER ↓	NAME OF EMPLOYEE (Type or print) (18)	TAXABLE WAGES PAID UNDER FEDERAL INSURANCE CONTRIBUTIONS ACT (19)	STATE (20)
037054696	JAMES R	70420	
037054699	ALBERT W	78340	
037054784	FRANK K	81210	
037055792	JOHN W T	53700	
037055803	TONY M	53290	
037055894	ABE G	67260	
037055944	JOHN P M	48930	
037056242	JAMES O	67520	
037056273	CYRUS L	80230	
037056483	FRED K	56970	
037057357	JAMES P	104820	
037057642	JOS S	46200	
037057642	G	64780	
TOTAL FOR THIS PAGE—Total taxable wages paid		\$ 2730270	

Another byproduct of machine payroll and accounting work—a quarterly Social Security report obtained from a tabulation of punched cards at a rate of 6,000 lines an hour by machine.

producers working under the recent agreement with the United Mine Workers, the daily earnings rate was made up of three factors: seven hours of regular time at the regular rate, time-and-one-half for the eighth hour and \$1.50 for the ninth hour. Under this formula, a man getting \$1 per hour received \$7.00 for the first seven hours, \$1.50 for the eighth hour at time-and-a-half and \$1.50 for the ninth hour.

When the times comes in, whether in a time book or on daily time sheets, all that is necessary is to punch the man's check number, hours worked, basic rate and account to which the work is to be charged. It makes no material difference whether the time comes in in the time books in numerical order or not. It is punched as it is seen from each time-book or time-sheet entry, as the cards can be sorted into numerical order later, either before or after rating them.

Here is where the "Multi-Control Reproducing Punch" comes in. A set of master cards are punched showing the extensions for the days at the various rates, for the overtime days at the various overtime rates and also for the double-time days, because there will be some of those too. The detail cards are

PERIOD ENDING 19

PAYROLL

PLANT _____
PAGE NO. _____

STRT.

EMPLOYEE'S NAME	EMP. NO.	HOURS			HOURLY RATE	EARNINGS			DEDUCTIONS					NET PAY	
		Straight Time	Overtime	Total		ST. TIME	OVERTIME BONUS	GROSS PAY	INSURANCE	O. A. S. I.	WITHHOLDING TAX	BONDS	MISC.		
JAMES R	617	40	8	48	100	4800	400	5200	50	52	910	400	50	1462	3728
JOHN M	619	40	4	44	80	3520	176	3680	25	37	640	250		952	2728
JOHN P M	630	40		40	80	3200		3200	25	32	190	320		567	2633
BERT R	632	35		35	80	3500		2800	25	28	290	200		543	2257
NETO M	633	40	4	44	110	4840	220	5060	25	51	500	500	50	1126	3934
JOHN M	635	40	4	44	110	4840	220	5060	25	51	320	480		876	4184
GEORGE O	637	40	4	44	80	3520	160	3680	25	37	260	350		672	3008
JAMES P	642	40	8	48	150	7200	600	7800	25	78	1170	720		1993	5807
STEPHEN U	643	40		40	110	4400		4400	25	44	560	440	25	1094	3306
JOHN	644	40	8	48	90	4320	360	4680	25	47	430	500		1002	3678
GEORGE M	645	40	8	48	110	5280	440	5720	25	57	1010	528		1620	4100
JUSTIN K	651	40	4	44	90	3960	180	4140	25	41	530	350		946	3194
ESTON B	653	40	8	48	90	4320	360	4680	25	47	430	432		934	3746
JAMES M	665	40	4	44	110	4840	220	5060	25	51	680	484	50	1290	3770
REG	667	40	4	44	110	4840	220	5060	25	51	500	484		1060	4000
JANK K	669	40	8	48	110	5280	440	5720	25	57	1010	792		1884	3976
GL						320	360	400	25	40	450	400		722	
JERRY W	671	40	8	48	80	3840	320	4160	25	42	160	250	50	527	3635
IS S	672	40		40	80	3200		3200	25	32	170	100	50	377	2823
ED K	673	40	4	44	90	3960	180	4140	25	41	340	300		706	3434
GEORGE C	675	40	8	48	100	4800	400	5200	25	52	330	480		887	4313
JAMES O	676	40	8	48	100	4800	400	5200	25	52	330	480		887	4313
JOHN W T	678	35		35	90	3150		3150	25	32	170	100		327	2823
ERNEST K	680	40	4	44	90	3960	180	4140	25	41	340	400		806	3334
						132060	6180	138240	325138213360	9840	350	25257		112983	

Payroll record made up as a byproduct of preparation of tabulating cards.

sorted by rates, getting the .966 rates in one group, the \$1 rates into another group, the \$1.023 rates into another group, etc. These detail cards and the master cards are placed in the "Multi-Control Reproducing Punch" in the same sequence. This machine will compare the rates on the detail cards with the rates on the master cards and will punch the extensions on the detail cards at a rate of 6,000 cards per hour. In other words, these 6,000 extensions can be made in an hour, which is about twenty times faster than they could be written by any other method, to say nothing of the extension.

For those interested in accumulating data as to the cost of the new contract over the old, a set of master cards based on the old rates can be made up and the machine made to punch these rates into the detail card in another field. By a simple tabulation of these cards (done at a rate of 6,000 cards per hour) three figures can be obtained—the total earnings at the new rate, the total at the old rate and the difference, which is the amount of the make-up. There is no

other known method of accounting that will produce this necessary management information as a byproduct.

After these rates have been extended, the cards can be sorted into check number (payroll) order and tabulated. By making in one writing two extra copies of the tabulation, which is an itemized statement of earnings credited to each employee, one can be placed on the bulletin board so that the employees may see daily the amounts credited them for day labor just the same as they see the checkweighman's tipple sheet, and the other can be furnished to the mercantile or credit department as a basis for their daily issues of credit. These are obtained as byproducts of the tabulation of the cards and require no additional time or effort.

Since the contract with the mine workers provides for the addition of one-ninth to the earnings of tonnage workers, including yardage, dead-work and part days, to take care of pay on a portal-to-portal basis, the description up to this point refers only to the earnings and time of tonnage workers. Workers

paid on a daily basis need only to have their check number, hours and rate punched. By use of the "Multi-Control Reproducing Punch" and master rate cards, automatic extension of their earnings on their daily cards is achieved.

Costing Operations—As all account numbers have been punched on cards as they are prepared, the costing operation is simple. The cards are put into a sorter and sorted according to account numbers at a rate of 420 cards per minute. Then, they are run through a tabulator at a rate of 100 cards per minute, tabulating the costs by accounts and producing totals. A "Summary Punch" is hooked up with the tabulator and as each total is produced a summary card is prepared for use in tabulating the monthly costs.

After the costing operation, the cards are put back in the sorter and sorted by payroll numbers. The cards then are run through the tabulator to produce the gross payroll. The total of the gross payroll will be in agreement with the total of the cost tabulation. This fur-

nishes the company with a daily proof of costs and payroll data and there should be no such thing as "arbitrary adjustment of costs to agree with the payroll."

At the close of the pay period, with the cards sorted and filed in payroll order, the statement of earnings by payroll accounts for the month can be produced, and this will give the employee a statement of his daily earnings as well as the total earnings month to date. In addition, as a byproduct of the posting operation, there can be produced a total of the tonnage mined, tonnage cut by machine men and total hours credited. With the posting of this and other information, a master summary card of earnings for each employee will be punched for use in automatically securing F.O.A.B. and withholding taxes, together with the net earnings, after taxes, for each employee.

All the mechanical systems I have seen thus far are predicated on the assumption that tax calculations have to be made manually, when, as a matter of fact, a large installation for tax purposes is based on the preparation of the earnings side of the payroll by hand.

Computing F.O.A.B. and Withholding Tax—The method of computing F.O.A.B. and withholding tax is as follows:

The "Tax Cards," reproduced from "Gross-Pay Summary Cards," are first sorted on the gross pay "Tens of Cents" column and separated into two groups—0 to 49c. and 50c. to 99c. Each group is then sorted by "Gross-Pay Dollars." The final sort is by "Exemption Amount" to group the cards by various dependency classes. Thus, a file of pre-punched master tax cards has been created. The withholding tax is computed as though the gross taxable amounts were \$1.25 or \$0.75, depending on the group of master cards that is used. The amount withheld under this method could never vary from the actual tax by more than 5c. each pay period.

The "F.O.A.B.-Withholding Tax" master file is placed in the upper feeding magazine of the "Multi-Control Reproducing Punch" and the tax cards are placed in the lower feeding magazine. "Comparing Controls" are set on the "Exemption Amount" and "Gross-Pay Dollars" fields. The corresponding tax amounts are punched into the "Tax Cards" automatically at a rate of 6,000 computations per hour.

On every payday, 1 percent must be deducted from the gross earnings of every employee up to the first \$3,000 earned. One problem (and it's a big one for all employers) is to find an easy and automatic way to determine the

breaking point at which deductions are suspended. Through the use of tabulating machines, it is possible to provide a completely automatic control by which the "Earnings Cards" can always be segregated into three classifications:

- A. Men who have not reached the \$3,000 earnings limit.
- B. Men who pass the \$3,000 earnings limit at this particular period.
- C. Men who have passed the \$3,000 earnings limit at a prior period.

These distinguishing punches are arrived at purely by automatic methods—regardless of the human element—and perpetuate themselves throughout the fiscal period. No payroll adjustments or refunds on F.O.A.B. deductions will ever be necessary.

In view of the fact that Social Security legislation requires quarterly reports to be made for all employees, the cards have been designed to carry also "Quarterly Gross Earnings" in a separate field. Accordingly, at the end of any quarter, the file of "Year-to-Date Earnings Cards" can be run with no interruption of normal routines and quarterly Federal SS-1B and State reports can be run at a moment's notice. And, it might be pointed out here, these reports are run at a rate of 6,000 lines per hour, so it can be said that the "Quarterly Earnings Report" for any coal mining company with 1,500 to 2,000 employees can be run off and balanced in a matter of less than three hours.

Deductions—As is well known, deductions from payrolls present the biggest problem in coal-mine payroll accounting procedure. It is nothing for the average company to have 25 to 30 different items of deductions applicable to the pay of their employees. Of course, all these deductions will not apply to all of the employees. Some will have eight or ten different deductions and others will have two or three and there are some who will run the whole gamut "and then some."

Mechanizing a payroll under such circumstances presents a problem that is hard to solve. Some companies use bookkeeping machines for handling these deductions, which are preposted all during the period. This involves a separate run of postings for each deduction with the necessary picking up of the previous balance, posting either the name or code number of the deduction, the amount of the deduction and the payroll number of the employee, the machine computing and printing the new balance, plus the pickup of the old

balance for proof purposes. Handling in this manner naturally limits the posting to the speed of the machine and subjects the posting operations to the human element, mistakes in picking up old balances, improper coding of deductions and other errors.

Theoretically, it is not possible to carry a balance from one account into another, but in actual practice it is found that some machines perform "unheard-of tricks" in this connection and instances are known to this writer where entire page totals were carried into account balances, producing fantastic balance figures. As a consequence, more time is spent in auditing the work after it is done than is spent in doing the job. To obviate the necessity for picking up so many old balances and repeating so many postings, pen-kept control cards have been set up carrying fixed recurring charges so that several charges are posted in one run. However, for distribution purposes, proofs of such postings must be audited to secure proper distribution of the charges made. The human element still is in the picture because the failure to post one item from one of these cards would upset the whole picture and would make it necessary to audit every item in the posting to locate the error.

Because of these factors and the fact that most of the payroll deduction charges are fixed amounts, such as rent, medical attention, hospital, etc., which occur each half, the use of tabulating machines is the only method by which such charges can be made quickly and accurately. Non-recurring charges or charges of varying amounts can be quickly made by punching and proving cards from proper journal vouchers of such charges and these can be sorted in any manner desired.

After the payroll is closed, the deduction cards can be sorted according to deduction amounts and a balanced statement, entirely in agreement with the payroll deduction sheets, can be secured for entry, properly crediting all revenue and other accounts for the exact amount of deductions made from the payroll.

Because of the flexibility of the system, it makes no difference whether an employee's account has one deduction or fifty—the amounts are deducted from the earning of that particular employee and no other, and with speed and accuracy that cannot be duplicated by any other method.

This method of accounting is used by large concerns in the steel industry and the automobile industry and by government bureaus, particularly with reference to Social Security accounts, and there is no reason why it would not be equally successful in coal-mine payroll accounting.

EXIDE-IRONCLAD POWER KEEPS SHUTTLECARS STEADILY ON THE JOB—ALL DAY LONG



FULL shift availability is assured when your shuttlecars and locomotives are powered by rugged, trustworthy Exides. They keep loaders busier . . . supply the main line faster . . . and you can count on sustained speeds, without interruption, straight through to the end of every shift.

Exide-Ironclads have the *high power ability* that frequent "stop and go" service demands . . . the *high maintained voltage* that heavy hauling requires . . . the *high capacity* that assures steady, full-day performance. And rugged Exide-Ironclad construction is assurance of dependability, long-life and ease of maintenance.

If you have a special battery problem, or wish more detailed information, write to Exide and ask for booklet Form 1982.

SAFE POWER



THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto



The Foremen's Forum

Exhaust Vs. Pressure Fans: Advantages and Drawbacks of Each

When Pressure Fan Stops, Expansion Brings Little Methane to Heading—Pressure Fan Has Many Merits But Also Introduces Conditions Adverse to Safety

WHEN a pressure fan is started, it pushes the air back into the goafs, gobs, rooms, headings and airways, and, conversely, when it stops, pressure falls and a little of the air in these spaces returns to the roadways, carrying with it all the impurities which that air contains. It is distressing enough to have the fan stop, shutting off the ventilation, failing to force in fresh air and to carry away bad air, but when that is accompanied also by an immediate movement of methane toward and into the roadways in the mine, the effects might seem likely to be disastrous. That is why the pressure fan often has been deprecated.

With an exhaust fan, the condition is reversed. The pressure that, before the stoppage, was below what was momentarily that of the atmosphere, ascends promptly to that figure, and the increased pressure hustles the air back into the goafs, gobs and similar places where lights and sparks are less likely to be encountered.

Goaf Releases Only 0.5 Per Cent of Its Volume—However, it is well to put the problem in figures, and thus find out how much importance can be placed on this advantage that the exhaust system possesses over the pressure system, as viewed from this angle. Where the water gage at the fan is 4 in., the change in the pressure when the fan stops and the air current ceases to travel in a mine with looped ventilation will be equivalent to only about 2 in. of water. But 30 in. of mercury is equivalent roughly to 34 ft., or 408 in., of water, so the pressure on the open mine spaces when the pressure fan is stopped will fall from 410 to 408, a drop of 2 in. in 410, or 1 in 205, which is relatively inconsequential.

After all, when the fan was started, it threw back the air in that proportion, and, if it is not still there, and it probably is not, it is (1) because the atmospheric pressure now is higher or lower than it was then and has allowed the impure air to move from or toward the heading or (2) because the escape of methane or carbon dioxide has made the air originally in the space move its outby line back toward or to the edge of the heading or (3) because of diffusion. Though the line between good air

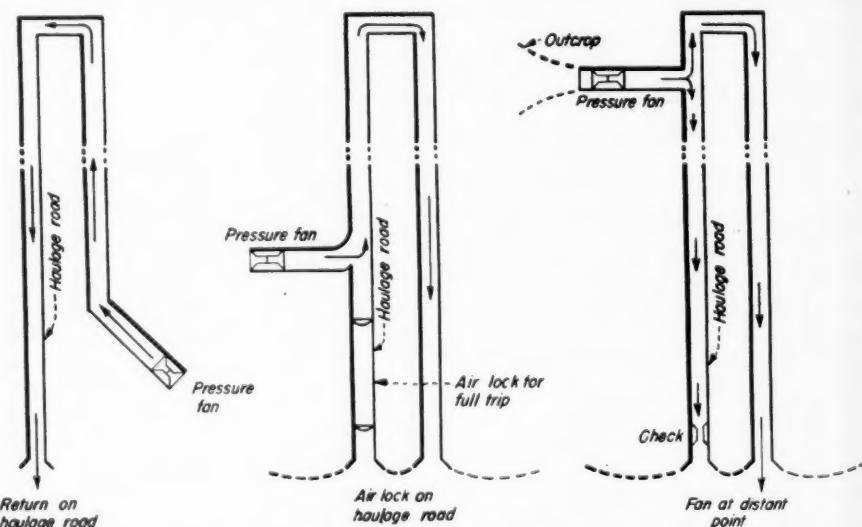
and old goaf air may be farther outby than when the fan was started it may, on the other hand, be farther inby. Without these expansions, contractions, additions and diffusions and hence without the advances or retreats of the line separating original goaf air from heading air, the goaf air would still be well back in the goaf at a distance such as will provide for an equivalent of one two-hundredths of that space.

Baric Breathing More Effective—Changes of barometric (baric) pressure are far more active in bringing noxious gases to the headings and they are likely to occur, of course, with both pressure and exhaust ventilation, but it must be confessed that their full significance is not felt over short periods of time, so the ventilation usually has time to sweep away any spillage of bad air as it occurs. The 2-in. fall from the stoppage of a fan will cause a drop only one-seventh as great as a fall in the barometer of 1 in. of mercury, but the action is sudden. It occurs before the standby power can be brought into operation or the damage to the fan can be repaired.

The barometer may fall an inch (gaged in mercury) in a day, whereas the fan pressure will fall 2 in. (gaged in water) in a few minutes, and the fan is not running to take the released methane and carbon dioxide away. However, with such larger movements in operation, it is likely that there will be enough leeway that the drop caused by the stoppage of the fan will not cause the air in the space to slip into the haulageway and what will slip in will be carbon dioxide rather than methane, because the place usually rises and the heavy dioxide tends to station itself in the room neck.

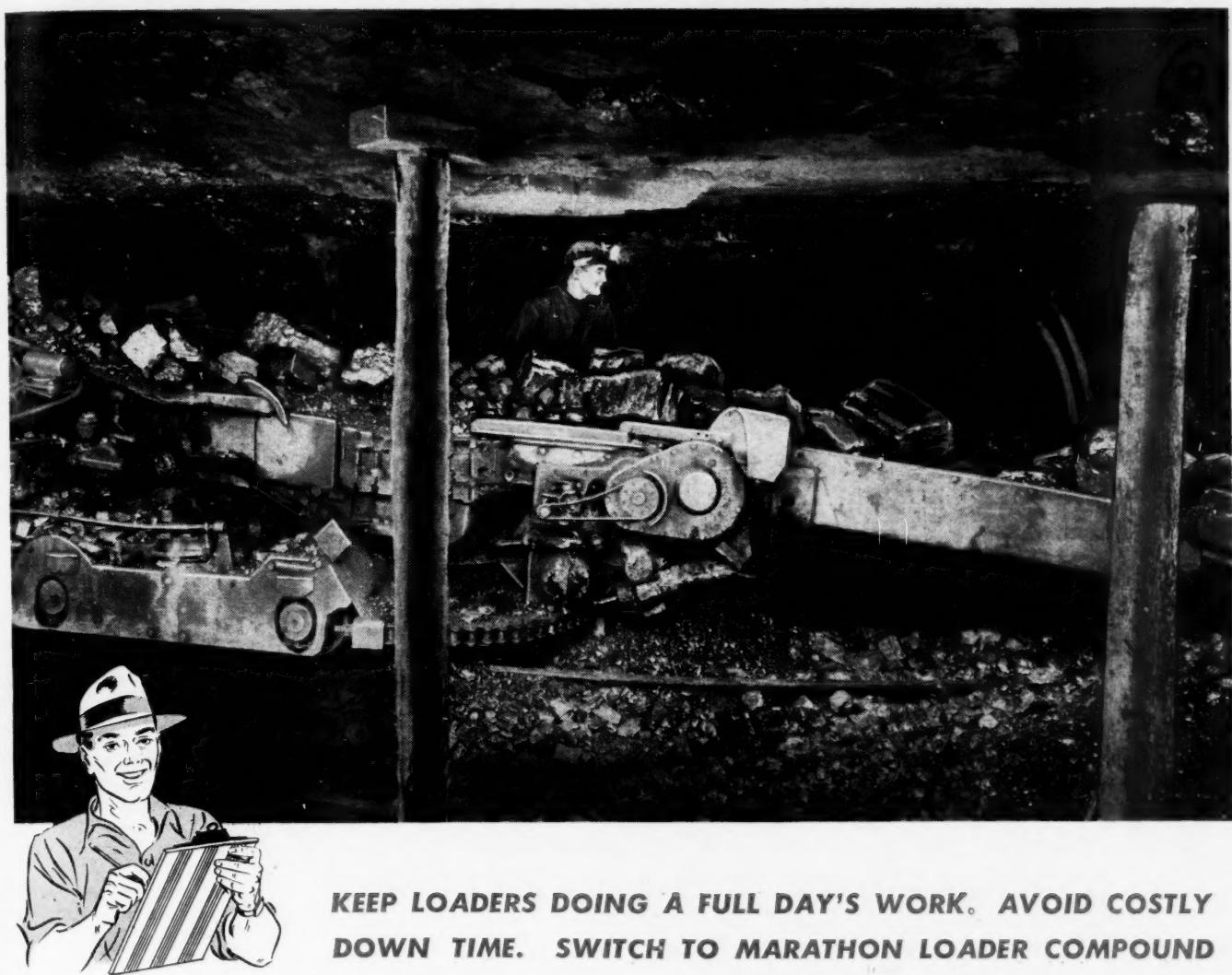
Still in measuring safety it is the rule always to take the worst possibility, not the best, and indulge always in "despondent" rather than "wishful thinking." One two-hundredths of the goaf area of a single room would be perhaps an area of 1.5 ft. multiplied by the distance between room centers, if the constituent rooms were 300 ft. long and the coal bed as thick as the heading is high. The distance between room centers is the same for the goaf as for the heading, so a heading 10 ft. wide, if the noxious gas was on the line of the heading rib when the fan stopped, will have 15 percent of its space filled with goaf gas, and if the proportion of methane in the goaf is 10 percent, the proportion of methane in the heading would be 1.5 percent.

As the methane might be mixed with 90 percent or thereabouts of incombustible, the heading might have 90 percent of 15 percent or 13.50 percent of inert gas, added to the inert gas that is found in natural air. We begin to see why the failure of a force



Three ways of applying pressure to working. The first, the more usual and more dangerous way, carries the air under pressure, first along trackless headings to the live workings and then back to the haulways, thus putting methane in these critical roadways.

Why let excess clutch slippage put a drag on production?



KEEP LOADERS DOING A FULL DAY'S WORK. AVOID COSTLY DOWN TIME. SWITCH TO MARATHON LOADER COMPOUND

RIGHT NOW, you need every loader on the job, working at *top* capacity. And that means right now is the time to switch to Marathon Loader Compound . . . the lubricant that is *specially designed to lick excess clutch slippage*.

Talk to managers of many of America's leading mechanized mines. They'll tell you that Marathon Loader Compound holds slippage

to a minimum . . . holds down trouble-making carbon on clutch discs . . . prevents heat-warped plates that lead to costly breakdowns.

If you want top capacity from your loaders . . . if you want to avoid production-slowing "down time" . . . get full facts about tested, proved Marathon Loader Compound. Write, wire or phone. Ask an Ohio Oil Company Lubrication Engineer to call.

THE OHIO OIL CO.

A complete line of lubricants for every operation in your strip or shaft mine

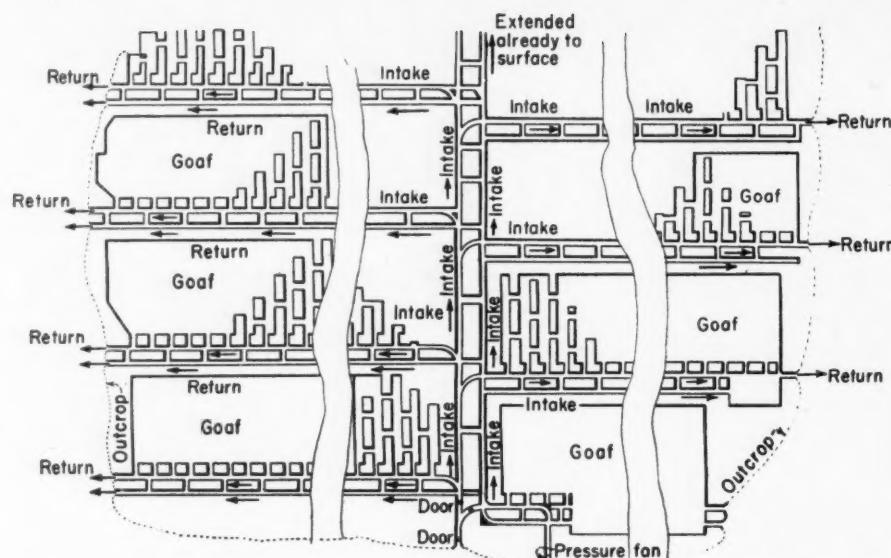
General Offices: Findlay, Ohio

District Offices: Robinson, Ill., Indianapolis, Ind., Louisville, Ky.

PRODUCERS OF PETROLEUM SINCE 1887

COAL AGE • August, 1946





In this mine the air under pressure goes first along the haulways, then to the live workings and after that to the surface, thus confining haulage to the intake.

fan rarely causes an immediate explosion and is barely any more dangerous than the stoppage of an exhaust fan, which, in stopping, allows the air to be driven by the increased pressure into the goafs and gobs and away from the headings. The danger is in the air stoppage rather than in the reduction of air pressure.

Must Haul Trips in Bad Air or Trap the Air That Fan Forces Into Mine—Another charge against the pressure fan is that, with it, either haulage must be on the return or the haulway must be provided with doors so that the air driven into it by the fan under pressure will be prevented from escaping from the portal. To assure this it will be necessary to trap the trips in and out with double doors just where the pressure of the fan is at its highest and where more of the air going to the mine will be cut off whenever the two doors may chance to be left open at the same time than if these doors were at any other location. Either method is objectionable. One puts the haulage into the methane, fumes and coal dust from the face, the other makes certain that the mine will be deprived of ventilation if both doors are open at the same time unless natural ventilation supplies the mine's need. But with automatic doors this objection should be overcome at least as far as trips are concerned. However, not only mine cars but men should be trapped into the mine. Revolving doors of proper strength and construction should be designed for this purpose. A weak door will bind on the revolving flaps.

Nine Counts for Pressure Ventilation—The advantage of the above layout is:

- (1) That air can be driven out of a shallow mine at a number of drifts.
- (2) That the air accordingly will not have as far to travel as in a looped-ventilation mine.
- (3) That when connections are made to the surface all the headings in the entry thus vented can be used as intakes as far as the active workings and as returns from that point onward, thus carrying many times as much air into the mine per kilowatt-hour of electricity expended.

sistance to travel of air would be sufficient to restrict the split that ventilates that portion of the haulway so that it would serve only for the trifling needs of that split.

Small-Scale Research At the Coal Mine

Too often you point with pride to a contrivance or method that dates back a generation or more, as conclusive evidence of your many years of "know how." The very fact that you are doing something the same way you did it ten, twenty or thirty years ago is the very best reason for believing that somewhere or somehow there must be a better way. When you set out systematically to find that better way, you have made a start toward undertaking and practicing research.

As a preliminary for getting started in this direction, suppose you take pencil and paper and sit down with some of the fellowmen on the company staff after writing a list of projects under the heading—*What in my mine do I wish I could change for the better.* You already have talked doubtless about these problems in a vague sort of way, and have them in the back of your mind, but this time bring them out and make a list of them in black and white.

The minute you formulate such a list and acknowledge to yourself that there are definite problems to be licked—you are ready to start research in a small or large way. You, be you owner, superintendent, foreman or assistant foreman, will qualify as your own expert, if you will honestly analyze without prejudice the defects in the systems now in operation in your mine. You don't need a research staff to begin a systematic consideration of the problems thus outlined.

This advice has been adapted from an address by H. L. Smith, made at a research conference in Boston, Mass., himself one of the staff of a relatively small company. Much research, not however so designated, has been set in operation again and again in the mines, but more of it is needed.

We have a host of problems with moss-bound "solutions." Sit down and discuss them and then try out alternative ways of meeting them. You may be nearer the answers than ever you thought. Perhaps the very fact that you term your efforts research instead of brilliant improvisation, may bring you the success you desire.

Wad of Clay Protects Against Explosion

From H. C. Howarth, coal mine superintendent, Experimental Coal Mine, U. S. Bureau of Mines, comes a note correcting a table entitled "All-Around Stemming Subdues Flame in Creviced Coal," published in *Coal Age*, April, 1946, p. 112, as based on an article by H. C. Grimshaw in the *Iron and Coal Trades Review*, October, 1945. He states that the charges in Series 3 and 4 which proved so efficacious in preventing an explosion were unsheathed charges. All the protection these cartridges had were stemming in front of the charge and a 1-in. bicarbonate-of-solid plug in the rear and a 1-in. plug of moist clay behind the charge respectively.

**Give Production Crews
Better Tools Through**

BETTER CABLES



Nothing boosts the morale of production crews like power and plenty of it! So assure *full face voltage* by using dependable cable . . . *Securityflex**. Built to stand up against acids, moisture, flame, abrasion and physical abuse. Consult Anaconda engineers for help on cable problems. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. Sales Offices in Principal Cities.

FLAME RESISTANCE!

Specially compounded Neoprene Jacket and heat-resistant insulation make Securityflex the safest cable possible. Meets specifications of Pennsylvania Act 206.

BREAKER STRIP!

Minimizes shorting under extreme heating or compression, and also anchors jacket, prevents loosening of conductors.

MORE CABLE PER REEL!

Made possible by small diameter, flat parallel sides.

NO LOOSE JACKETS!

Special bonding process eliminates cable failures from loose jackets.

ANACONDA

Securityflex *

*Reg. U. S. Pat. Off.

CABLE

ANACONDA
from mine to main switch
ANACONDA WIRE & CABLE COMPANY



State-Board Questions

Mine Foremen, West Virginia

Defects of Auxiliary Fans

Q.—Why are auxiliary (blower) fans objectionable?

A.—Auxiliary fans though they have favorable features, have, like all innovations, their objectionable characteristics. They can easily be improperly located and dangerously operated, and they are so readily portable that they can quite readily be moved from place to place by anyone, authorized or unauthorized. Thus, they can be erected at an improper site, and thus be made to add rather than to reduce mine hazards. The manner of their operation has not been subjected to complete analysis so, in this and succeeding issues of this department, an extensive study perhaps may be pardonable. Among other hazards is the following:

Recirculation of Air

Fan May Be So Placed That Air Cannot Fail to Recirculate Excessively—Some foremen have placed such fans even in room entrances, as shown in Fig. 1, apparently from a desire to avoid the use of duct elbows, their cost and air resistance, and to eliminate the resistance that the auxiliary fans and ducts, when placed in the room heading, by their space requirements interpose to the direct air current which travels along the room heading. Also presumably they object to their interference with traffic. Under these conditions, unless the air leaves the advancing room or heading by crosscuts, it must all come back to the fan and be drawn back into it, because air from the room heading cannot well enter the room so long as the air in the room is under the pressure which the fan has imposed on it.

Thus, the air in a methanous mine, provided there are no crosscuts, will merely mix methane with the oxygen and nitrogen of the room atmosphere and furnish little fresh air except what was taken in this first gulp, much of which from the first came from the room and not the haulway. Such working places contain carbon dioxide and fumes from explosives, and so such recirculated air in mines, even through the working faces produce almost negligible quantities of methane, will soon become irrespirable, or at least harmful to human life, though much air, regardless of its dubious character, may be passing.

Crosscuts with Blocked Air

In Fig. 1, crosscuts are shown but, as will be seen later, where ducts are discharging with equal pressures in neighboring rooms these room crosscuts will be blocked by the

air from such fans, so that the crosscuts will serve no useful purpose so long as such fans are running. The placing of auxiliary fans within such rooms therefore cannot be condoned or pardoned.

Fan Just Outside Neck—In Fig. 2, the auxiliary fan has been placed outside the room, but so near the room neck that the return air from the mouth of the fan duct passes the fan and, as this return air is still under some of the pressure which the fan imposed on it in its earlier trip, the current can battle with the direct air current in the haulway, weakened, as it is, by the decrease in pressure behind the fan. By passing over and around the fan, the air always can find fairly ready access to the fan's inlet. Some of the air will be entrained in the direct air current and travel with it along the heading, but much will reenter the fan and be recirculated, adding to the methane content of the air and to its polluting gases and fumes.

Set Fan Airward of Room

Fan Preferably Placed at Next Room—As the air from the duct discharge of the auxiliary fan returns to the neck of the room which the air services, it would be well to place the auxiliary fan at the neck of the nearest room to "windward",* (or let us

coin a word, "airward,") of the room that the fan is to ventilate. See Fig. 3. Thus the air discharged from the duct in Room A will be in position to enter promptly into the fan, which services the neighboring room B, taking it away from the inlet of the first fan and from the hazards of the haulway and allowing it to pass to the face of that neighboring room B.

We have been for generations accustomed to drive the methane and other pollutants from room face to room face using line brattice for that purpose. It will be seen later that, with auxiliary ventilation, we make the same back-and-forth movement as in line-brattice ventilation. However, with auxiliary fans, the current goes back to the room heading to transfer from room to room instead of working its transfers at the last crosscut as in line-brattice operation.

Re-use or Donation of Air—We would have then, not recirculation, but "transfer" or "progressive" ventilation, and the current might be termed "re-used current" or "donative current", because it is given by one fan to its neighbor, or as in Fig. 3, from Room A to Room B. Such transfer ventilation should be encouraged rather than avoided. It is unfortunate that auxiliary fans have to use a method of re-use of air in room after room which has been the curse

* "Windward" means toward the immediate source of the wind and "airward" should signify toward the immediate source of the current.

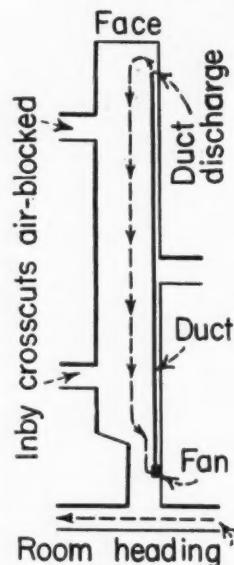


FIG. 1

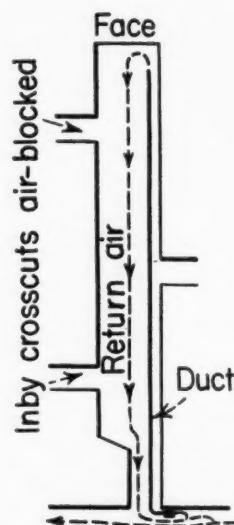


FIG. 2

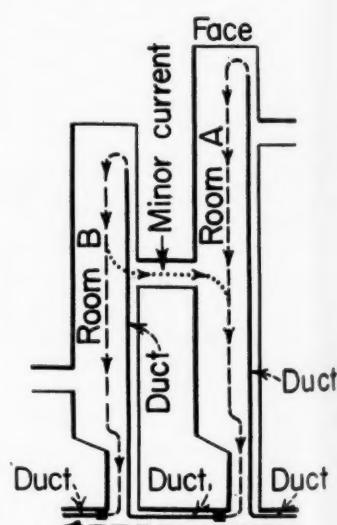
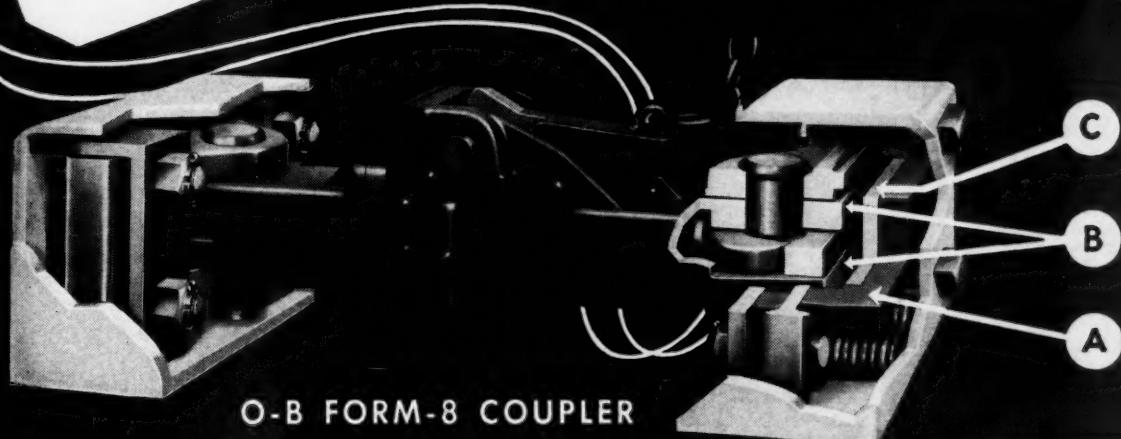


FIG. 3

Fig. 1—Fan in room. A large percentage of air will be recirculated. Fig. 2—Fan at mouth of room. More air will be picked up from the direct, or heading, current. Fig. 3—Fan which services Room B is placed at inby side of mouth of outby Room A. In this case, a large part of the air from this outby Room A will pass into the fan and go to the working face of the Room B without recirculation in Room A. Room B being shorter than Room A, its pressure will be higher, and this will account for the "minor current."

It's New!

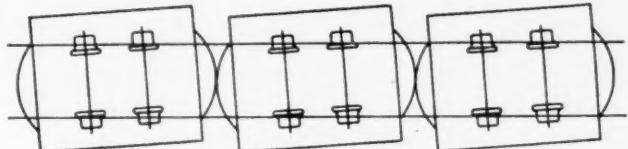
AN AUTOMATIC COUPLER THAT GIVES YOUR MINE CARS



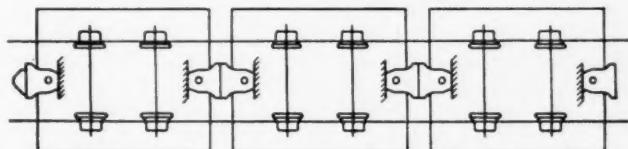
O-B FORM-8 COUPLER

Sectioned view of a new Form-8 Coupler. Up to 3000 lbs. push, the coupler is free to pivot around the clevis pin, the thickened ends of the rubber buffering pad (A) absorbing the compression. Above 3000 lbs. push, the coupler drawbar

ends (B) bear against the steel plate (C) embedded in and vulcanized to the draft gear. The stabilizing pressure thus produced pushes the couplers, and hence the cars, into alignment.



Under push or buff, a trip of mine cars equipped with links and pins and spring bumpers will assume this zigzag position on the track.



Because of its broad bearing surface, a trip of cars equipped with Form-8 Couplers holds its alignment on the rails, does not zigzag.

Here's an improved automatic coupler that will add TRACK STABILITY to your mine cars... one that will help to prevent buckling under buff... one that will keep your cars on the track, hauling coal for you.

Mine cars have always had a tendency to derail, caused largely by pushing against a single pivot-point as is necessary when cars are equipped with old-fashioned links and pins or ordinary couplers. The new O-B Form-8 Coupler eliminates this tendency by providing, instead of a single pivot-point, a broad pushing surface 20 square inches

in area. The stabilizing pressure thus created forces the cars towards the center of the track and counteracts any side-thrust to derail. If you are considering the purchase of new mine cars, investigate the track stability feature of the new Form-8 Coupler. Full information on request.

2717-AM

Ohio Brass

of line-brattice and all forms of room-heading ventilation, but we cannot provide, of course, for a separate split for each room face. It is often recommended that fans should be placed 25 ft. or more from the room to be serviced, and the plan suggested provides a site still further away and it gives maximum protection, because it takes the methanous air back to the face, where, as will be seen later, it will be less harmful than in the room heading.

Is Not Heading the Crucial Test?—It is important to keep the heading as free as possible from methane because to all the hazards of the subsidiary split are added three others exclusively present in the usual direct split; namely, the hazards of (1) sparking trolley wires, (2) falls of such wires, and in most cases (3) the practice of nipping on such wires. Of course, use of battery locomotives, or correctly designed diesel locomotives would eliminate all three of these hazards. There are many hazards at the face but all these can be protected by everyone taking certain precautions.

These are, of course, closed lights, permissible, or at least explosion-proof machines, kept in condition as to permissibility and explosion-proofness, fully protected leads and firing cable, also proper stemming and permissive explosives. Though many of them may fail due to neglect or carelessness, the recirculations just discussed do not seem likely to develop as much hazard as would be apparent if the methane were carried in the haulway.

Breezy But Highly Explosive

Recirculation is objectionable because the air thus passing seems fresh. "Why," says the miner, "should I test it?" The answer is that its apparent quality of freshness arises only from its constant motion. This makes it carry away perspiration before it has time to cool to sweat. Far from being fresh, it will get more methanous every minute and, what is more, it mixes the methane with the air so completely as to make a firedamp of a type most favorable for a violent explosion. The explosive gas is so intimately mixed with the necessary air to make all of it explosive from neck to face of room. As soon as the necessary methane percentage is reached, all of it, if ignited, will explode.

Danger in Perfect Mixing

Catastrophic Explosion Less Likely Where Methane Is Not Mixed—Without such mixing as an auxiliary fan may provide by recirculation, some of the atmosphere would not explode because it would have too large a percentage of methane and some would not explode because it would have too small a percentage of methane.

In such a case, only the small portion that reached the limits of explosibility could explode and some of the rest would have a little but not a real part in the explosion. This is the condition of a place without auxiliary fan or line brattice.

Explosion Delayed but Made Only More Forceful—When air recirculates through a fan, the methane percentage that will permit of an explosion may be delayed by that mixing, but as soon as the percentage is reached it will not only explode in spots but will explode over the entire area subjected to that mixing, not only at the face but

along the room from face to neck and in the air duct. The requirement for perfect combustion that oxygen and methane shall be in contact over the entire area has been complied with, and the utmost violence and destruction results.

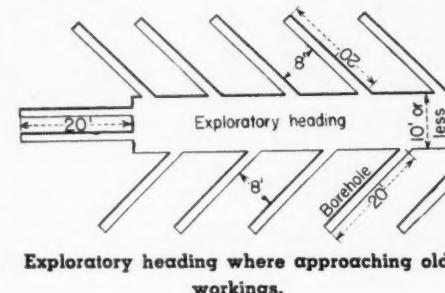
That is why at the end of a heading, with auxiliary fans and line brattice alike, it is

necessary to keep the trolley wire from contact with methanous air, (1) because the percentage of methane may be in excess of the lower explosive limit of that gas and (2) because the mixture has become so complete that all the air and all the methane will take part in the combustion the moment the initiating spark or flame is introduced.

Mine Foremen, Pa., Bituminous

Q.—When driving a place to tap and drain water from an abandoned mine, what precautions must be taken to comply with the law?

A.—In driving a passage to remove water or gas, the mine foreman shall provide (1) that the place shall not be more than 10 ft. wide and (2) that at least two boreholes be maintained not less than 20 ft. in advance of the face and that on each side of the place, boreholes 20 ft. long shall be drilled diagonally not more than 8 ft. apart. Water shall not be tapped until the employees, except those engaged in the work, are out of the mine. Work shall be done under the immediate instruction and direction of the mine foreman with everyone using approved safety lamps.



Q.—In mining what is meant by the term "air lock"?



A.—A space between two doors so long that a person or a trip, whichever is expected to pass, can rest between the doors, so that one of the two doors can be opened to admit the person or trip while the other door is closed against the passage of air. The first door is then closed and the second door opened and the person or trip passes through it. As soon as passage is completed through the second door that door is closed.

Theoretically, the pressure of the air in the lock is that of the air beyond the second door; say p_2 . Suppose that is less than the pressure beyond the first door p_1 . Then the tidal movement of air into the air lock is $(p_1 - p_2) \times \text{volume of air lock}$; then little air is lost when the first door is opened to permit the entrance of a person or trip, but in practice leakage prevents such a satisfactory result. However, air locks, especially with self-acting doors, save much air and keep the air traveling steadily in the direction desired.

Mine Foremen, Ohio

Q.—If a split is passing 30,000 cu.ft. of air per minute and the methane content is 0.5 percent, how much methane in cubic feet is liberated per minute?

A.—The analysis shows that 0.5 percent of the mixture of gases in the return is methane. In any percentage analysis, the proportions are based on a total of 100 units instead of on a single unit, so all the unit proportions have been multiplied by 100, and if we want to get them back to the proportions for one unit—in this case 1 cu. ft.—we must divide by 100 all of them or, in this case, both of them, for there are only one mixture of gases and one gas recognized—intake air and methane respectively.

To get back to unit values instead of percentage values, we can move the 5 in the percentage value back two places, changing 0.5 to 0.005, thus indicating that in each cubic foot of the mixture traveling through the return there will be 0.005 cu.ft. of methane, and in 30,000 cu.ft. accordingly there will be $30,000 \times 0.005 = 150,000$. To get this, we first multiply 5 by 30,000 and then get 150,000, and then have to mark off on 150,000 as many digits as there are places to the right of the decimal on that figure, or three digits, in 150,000;

therefore, we must put the decimal point so that there will be three digits to the right. Thus 150,000 becomes 150.000.

However, we have assumed that the question indicates the passage of a quantity in the return of 30,000 cu.ft. per minute. It may mean, however, that 30,000 cu.ft. per minute is entering the intake of the split and that more than 30,000 cu.ft. is leaving the return. When it gets to the return, that intake air will have 0.5 percent of methane and only the difference between that and 100 will be original air, or $100 - 0.5 = 99.5$ percent.

So the amount of methane actually added will be $0.5 \div 99.5$ times as large as the amount calculated from the analysis of the return. Now, $0.5 \div 99.5 = 0.00502512$. This is the quantity of methane for each unit of the original 30,000 cu.ft., so you multiply 0.00502512 by 30,000 and get 150.7536 cu.ft., which shows that, given 30,000 cu. ft. on the intake and 0.5 percent of methane in the return, the quantity of methane that has been added has been 150.7536 cu.ft. Thus there are two answers to this question, but their difference is inconsiderable, and it always is fair possibly to assume that the quantity measurement is taken where the analysis is taken, though it may not be.



POWER for SUSTAINED EFFORT

Gould Kathanode Batteries will speed mine shuttle cars throughout the service life of the battery

Like trained wrestlers, Kathanode batteries have endurance. They deliver 100% or more of rated capacity year after year.

Here's the reason why—



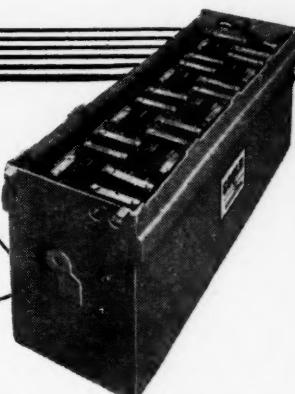
The extra large positive plates of the Kathanode Battery are packed with Black Oxide active material. Made in the Gould plant by an exclusive Gould process, this active material contains particles of pure lead, which, through normal cell action, replace spent active material as needed. Thus the power producing capacity of the battery is maintained.

Black Oxide is but one of Kathanode's special features. Get the facts. Write Dept. 118 for Catalog 300 on Gould Kathanode Batteries for Mine Shuttle Car Service.

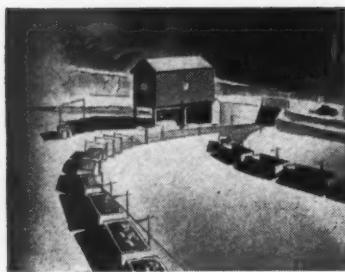


MEMO

John,
Give Kathanode
a try. We need
plenty of
power.
G.W.M.
General Manager



GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.
Service Centers: Atlanta • Boston • Buffalo • Chicago • Cincinnati
Cleveland • Detroit • Kansas City • Los Angeles • New York
Philadelphia • Pittsburgh • Portland • St. Louis • St. Paul • San Francisco



Operating Ideas

Cables Hung Over Spools on Pipe Standard

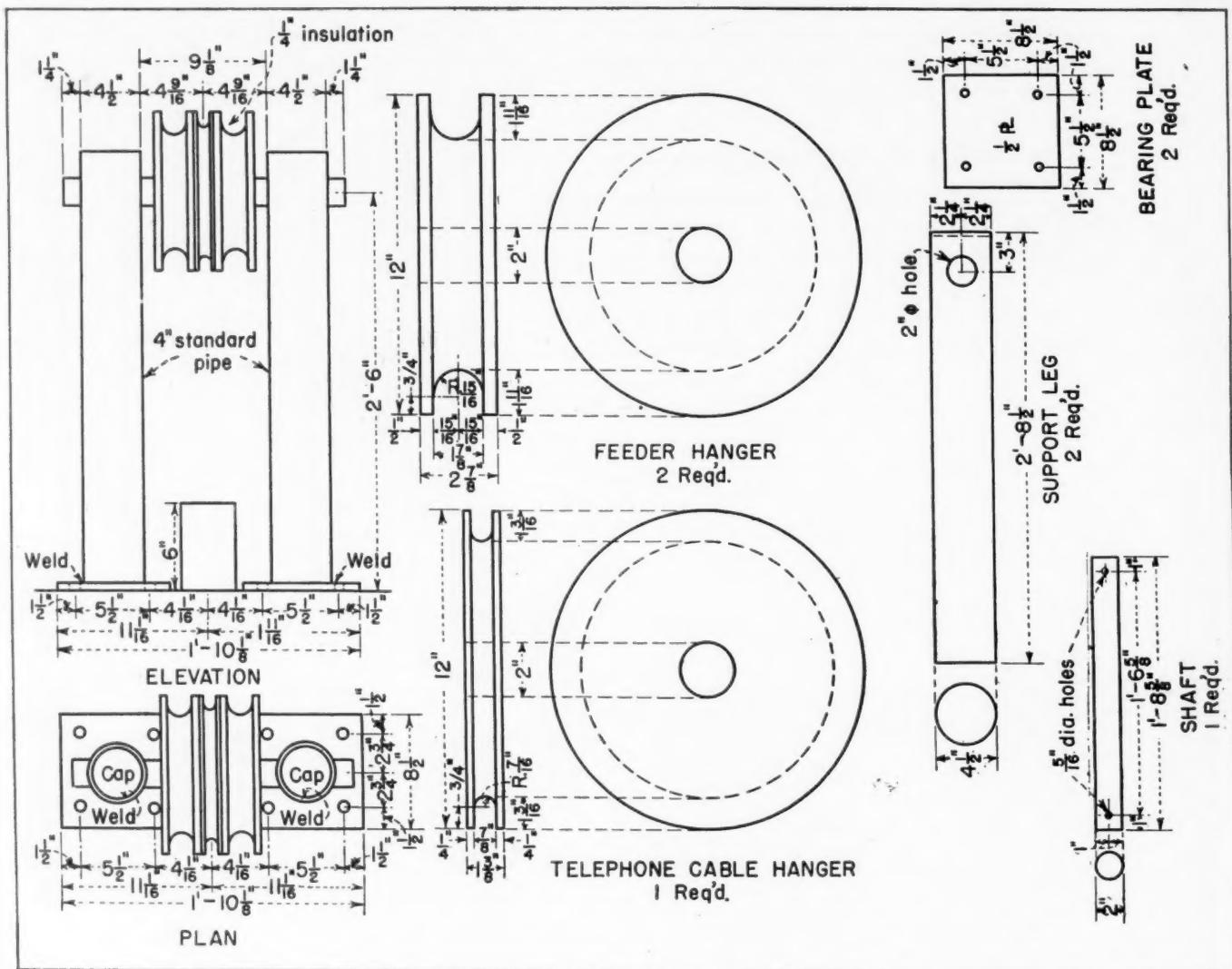
Neat and strong is the design of a suspension frame for power cables and a telephone cable in a 3-in. diamond-drill test hole in a new rectifier substation of the Glogora Coal Co., Blue Pennant, Boone County, W. Va. Cables are hung over steel sheaves, or spools, supported on two 4-in. pipes.

The diamond-drill test hole is inside a new building that houses a Westinghouse

300-kw. 275-volt sealed-tube ignitron rectifier. This is on the mountain top and the d.c. feeder borehole is 191 ft. deep to the upper mine of two operations in contiguous seams. The two power cables are 1,000,000-circ. mil. Both conductors are General Electric cable insulated with Flamenol. The telephone cable is a three-conductor type made by the Simplex Wire & Cable Co. Cable loops over the sheaves are secured by

servings of wire. The grooves of the sheaves are covered with high-voltage abrasion-resisting insulation $\frac{1}{4}$ in. thick. Original insulation is not removed where the cables contact the grooves.

This substation is one of three new ones, all with rectifiers and just completed to replace four motor-generator sets of an old and inefficient type. Details of the frame are illustrated below.



Suspension for power and telephone cables in borehole.

J&L STEEL

PIN AND LINK FAILURE
ON THIS COAL HOIST ELIMINATED BY
JALLOY
The Tank Armor Steel

Maintenance on the coal hoist above was a constant problem because of repeated failure of the links and pins on the bucket conveyor. All pins and links were replaced with new ones made of Jalloy, the special J&L steel made

for tough jobs involving heavy impacts and dynamic stresses. Since then down-time because of pin and link failures has been eliminated—costly maintenance work has been avoided. Write for information about Jalloy steel.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

Eyebolts and Pins Split With Cutting Torch

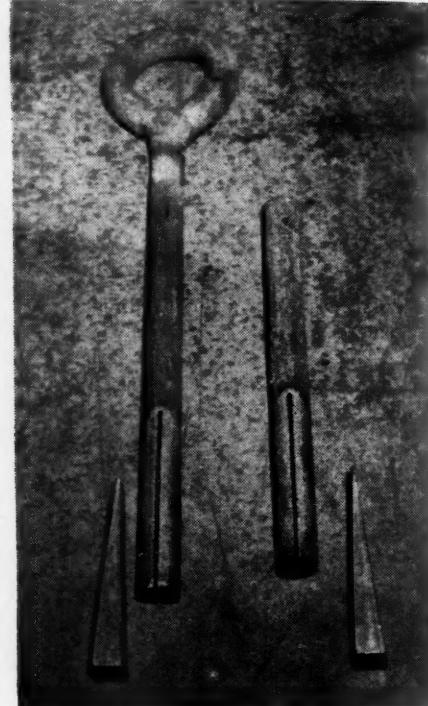
Wedged eyebolts and pins are split on one end more quickly and more economically with a cutting flame than with a metal saw at the Drifton shop of The Lehigh Valley Coal Co., Drifton, Pa.

The eyebolts and pins, shown in the accompanying illustrations, are made from 1½-in. round iron rods. In the case of the eyebolt a 3-in. circular ring is formed from the rod and the gap against the stem closed with a weld. The other end is split a distance of 6 in. with a track-mounted flame-cutting machine using a No. 2 cutting tip. The width of the slit is approximately 1 in. and the bottom side of the cut is about as clean as the top side.

The wedges are cut from a 1x6-in. bar steel by the same cutting torch and the only metal wasted is what is burned away in the cut.

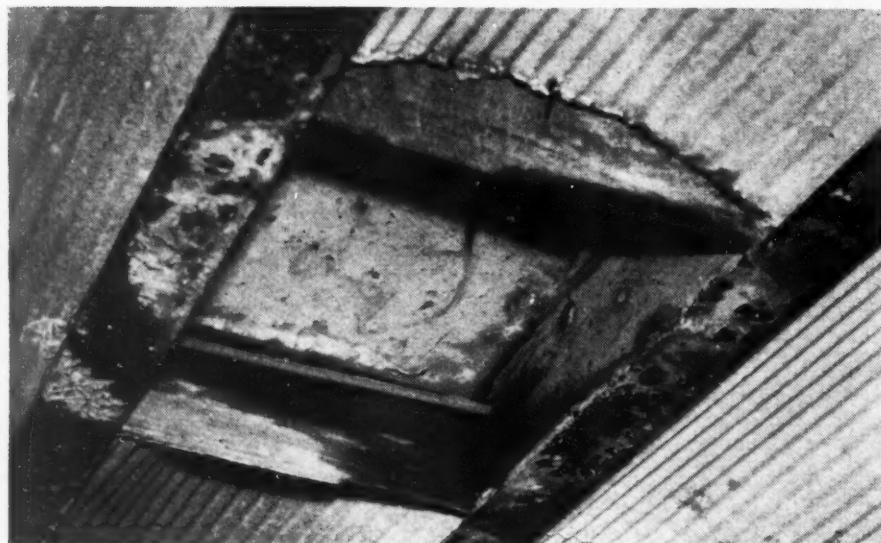
Wherever there is need for an eyebolt with a movable ring the straight pin is used. A 4x2-in. strap-iron hanger, of the length required to keep the pipe running level regardless of irregularities in the roof line, is attached by a ½-in. bolt to a ½-in. hole provided in the solid end of the pin. Both the eyebolts and pins are used as anchors in roof rock in the gangways.

The eyebolt with a wedge started in the split end.



Both the eyebolt- and pin-type anchors use the same size wedge. The pin-type anchors are used underground for carrying or hanging air and water pipes for coal and rock drilling.

Manholes Placed in Permanent Overcasts



Inspection manhole in overcast acts also as a pressure relief.

Airways are sometimes neglected because access doors are not provided for ready inspection. Remembering that, officials at Blue Pennant mine of the Glogora Coal Co., Blue Pennant, Boone County, W. Va., included trap doors in the design of new overcasts. Experience demonstrated another advantage of the door. It acted as a relief when heavy rock was being shot and apparently prevented destruction of a tile brattice nearby. That type of shooting had destroyed brattices but when done close to this overcast the trap door was dislodged.

The seam is 10 ft. thick in the No. 15 mine where the overcast shown in the illustration is located. Wing walls are 8-in. concrete and the 6-in. concrete top slab is supported by 6-in. I-beams on 24-in. centers. Corrugated steel was used as the form. Clearance between wing walls is 22 ft. Contiguous seams are being mined and the projections of the workings are columnized. Consequently, there is another overcast like this one, 45 ft. below it in No. 16 mine.

Triple test for oil

—inside your air drill!

WHEN high speed, high unit pressures and condensed moisture gang up on oil, you have a real problem in lubrication. That's just what happens inside your air drill.

1 That piston shown at right hammers up and down thousands of times a minute. Oil has a tough time clinging to the rubbing surfaces.

2 High unit pressures between the fluted section of the rifle bar and the rifle bar nut call for an extremely tough oil film to prevent excessive wear.

3 Rapid cooling of moisture-laden air means condensation of water, which tends to wash away protective oil films. Rust is always a threat.



THE ANSWER is Gargoyle Almo Oil No. 3. This oil maintains a tough, clinging film that guards against wear; seals the piston against "blow-by." It functions efficiently at low temperatures. Most important, it has the special quality of enclosing each particle of moisture in a stout "envelope" of oil—protecting vital parts against rust.

Get this Complete Lubrication Program for all your machines

- Lubrication Study of Your Entire Plant
- Lubrication Schedules and Controls
- Recommendations to Improve Lubrication
- Skilled Engineering Counsel
- Progress Reports of Benefits Obtained

Socony-Vacuum Oil Co., Inc.

and Affiliates: Magnolia Petroleum Company,
General Petroleum Corporation

Safety Dogs Protect Man-Cars on Slopes*

By Joseph V. Mather
Mining Explosives Engineer,
District B, U. S. Bureau of Mines,
Wilkes-Barre, Pa.

THE MINING LAWS of the various coal-producing states have rules governing safety catches on mine cages but safety dogs or catches for man-cars used on slopes usually are not required. Regulations covering safety dogs or catches for man-cars are lacking because an adequate device meeting all safety requirements has not been provided. Nevertheless, several types of safety man-cars and safety devices on man-cars are being used by various companies and a few of these devices are described in Miners' Circular 43, United States Bureau of Mines.

Drags are the safety devices generally used on man-cars ascending slopes, but they are inadequate and do not afford protection when a car is descending. The safety dogs described in this article afford protection in both ascending and descending slopes and they are attached to the man-cars at all times. These dogs are being used among other places, at the Pyne and Taylor mines of the Pyne-Taylor Coal Co. and the Franklin colliery of the Lehigh Valley Coal Co.

The pitches on which the safety dogs are used range from 10 to 40 deg. Several tests of the safety dogs were made at the Taylor mine and six at the Franklin colliery in the presence of several operating officials. When the tests were made, safety blocks or timbers of adequate sizes were placed across the tracks on the slopes and the man-cars were disconnected from the hoisting ropes. All the tests were successful, and the safety dogs stopped the cars within the short distances of 1 to 2 ft. from where the cars were disconnected.

The safety dogs are constructed so that they can be installed on most of the present man-cars without changes in car design. The necessary equipment for the installation is shown in Figs. 1 and 2.

The safety dogs, A, Fig. 1, are attached to the man-car by a separate axle under and near the up-hill end of the car. They also are connected to the wheel axle. Open slots are provided in the safety dogs where they are connected to the wheel axle, permitting them to be raised and lowered. When the safety dogs are released and drop to the floor, the car is raised. However, since the safety dogs are connected to the wheel axle, the car cannot be raised more than a few inches. The safety dogs are constructed of reinforced steel and weigh about 105 lb. each. The three photographic illustrations show front, rear and side views of the safety dogs in the down position. The side and rear views also show how the

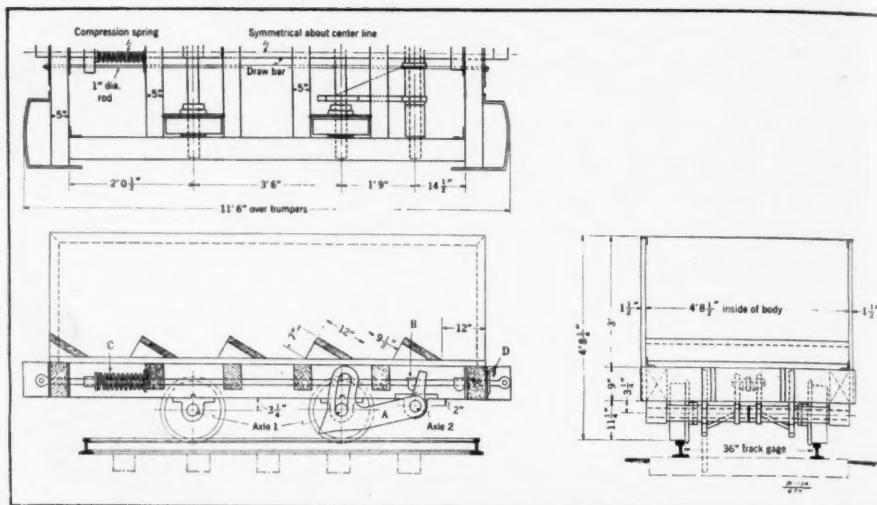
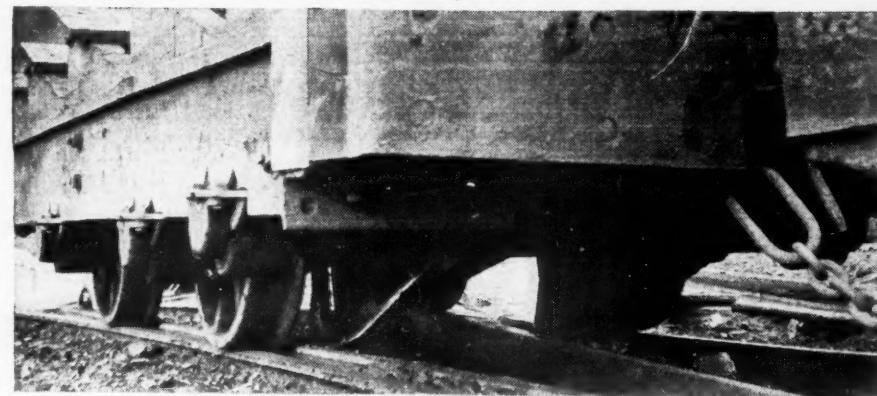


Fig. 1—Installation of safety dogs on a man-car.



From the top down, front, rear and side views of the safety dog on a man-car (Bureau of Mines photos).

* Published by permission of the Director, Bureau of Mines, U. S. Department of the Interior.

New

**COALMASTER "1046" DRILL BIT
CUTS DRILLING TIME AND COST
FOR 1 $\frac{7}{8}$ " HOLES**



- 1 One piece—solid shank assures longer life.
- 2 No drill head needed—bit fits directly into socket.
- 3 Scientific 2-prong spiral design reduces power consumption.
- 4 Special analysis heat-treated steel cuts faster, retains sharp edge longer.
- 5 Quick-change detachable socket fits directly into Series 0875 Coalmaster Auger.

Save drilling time—reduce your overhead with the new Coalmaster "1046" DRILL BIT. Available through the following distributors:

- Austin Powder Company, Cleveland, Ohio • The Buda Company, Harvey, Illinois
- Diamond Supply Company, Inc., Evansville, Indiana • Dooley Brothers, Peoria, Illinois
- Illinois Powder Mfg. Company, St. Louis, Missouri; Denver, Colorado, Salt Lake City, Utah
- Salem Tool Company, Salem, Ohio



CENTRAL MINE EQUIPMENT CO.

ST. LOUIS 8, MO.

dogs connect to the car and the wheel axle.

To operate the safety dogs, a drawbar extends from bumper to bumper under the cars. It is arranged so that it can be moved forward about $2\frac{1}{2}$ in. Metal extensions, B, are welded to the drawbar. When the drawbar is pulled forward by the hoisting rope, the metal extensions press against extending arms on the safety dogs, raising the dogs off the floor.

A compression spring, C, 5 in. in diameter and 15 in. long, made from $\frac{3}{8}$ -in. diameter steel, forces the drawbar back into position when the forward tension is released. This releases the safety dogs and they drop to the bottom.

To hold the safety dogs up and in a free position when the cars are uncoupled from the rope, and for shifting, a steel pin, *D*, is placed in a hole in the drawbar at the

coupling end when the drawbar is in the forward position. The steel pin is removed before the cars are placed in service.

The writer wishes to express his gratitude to the officials of the Pyne-Taylor Coal Co. for their assistance in securing this information and for granting permission to use it, especially Hyden Gills, safety engineer, and P. Condron, superintendent.

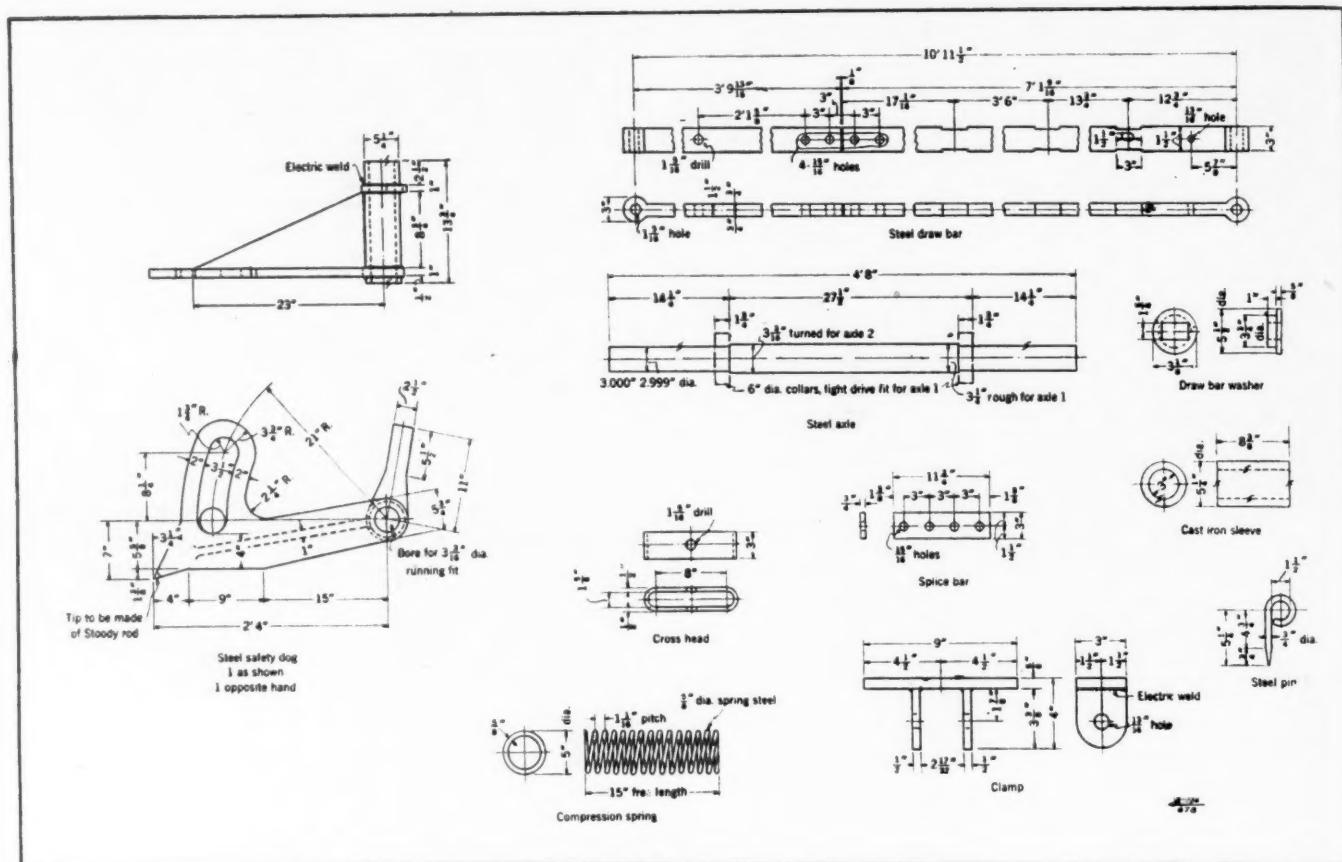


Fig. 2—Details of safety dog for man-car.

Adjustment of Steel Regulator Doors Retained by Locks

IF THE SETTINGS of one or more ventilation regulators are disturbed, the mine foreman or other ventilation supervisor may have quite a job getting them back where they belong. Consequently, the new fireproof regulators in the Blue Pennant mines of the Glogora Coal Co., Blue Pennant, W. Va., have a provision for padlocking them in any position of adjustment.

The regulator pictured (photograph made in No. 15 mine) has an opening 6 ft. high and its maximum width is 12 ft., thus providing a possible 72 sq.ft. of orifice. Doors are $\frac{3}{8}$ -in. steel plates stiffened by angles. The horizontal stiffeners through the center extend beyond the edges. Thus, they lap one another even when the doors are wide open. A series of holes in each angle provides for pad-locking matching holes together.

An H-beam is used at the top of these sliding doors and a 2x2x $\frac{1}{4}$ -in. angle at the bottom. The whole frame is set in a tile stopping and is recoverable when it becomes necessary to move the regulator to a new location.



Lapping angles of sliding doors provide means of padlocking the regulator to any adjustment.



Mine Car Wheels take a Terrific BEATING

*"The Road and Load
are Tough on Wheels"*

MINE car wheel requirements today are more severe than ever before. Heavier loads must be hauled at higher speeds!

A.C.F. mine car wheels are carefully designed to insure proper proportion of metal in the tread, flange, hub, plate and spokes—to secure maximum strength—with toughness—with durability—with an ample margin of safety!

Controlled heat-treatment in our manufacturing process produces "tough" wheels, with extra hard tread and flange

surfaces—to give you those "extra miles" of wear—with less friction on the rails!

Mine car wheels are a vital part of your transportation system. They must be good to withstand today's service requirements.

Why not discuss your wheel problems with our Sales Representatives—soon? You'll be pleased with the performance of **A.C.F.** wheels!

a.c.f.

SERVING YOU THROUGH SCIENCE

RUGGED GROUND? HEAVY LOADS?

*This tire beats
them both!*

The U.S. Royal Con-Trak-Tor is engineered and built for one purpose—to carry heavy loads over the very roughest ground. That's why it's a *natural* for construction, strip-mining, logging, and excavation jobs. See your U.S. Tire Distributor today!



1 TOUGH DEEP CLEATED TREAD: insures maximum two-way traction. Prevents rock retention.

2 TOUGH CENTER RUNNING RIB: minimizes wear and vehicle vibration on improved roads. Off-the-road, it restricts side slippage without loss of traction.

3 TOUGH CUT RESISTING TREAD: rubber is compounded to resist cutting, snagging and bruising.

4 TOUGH ROUNDED SHOULDERS: minimize snagging and cutting and improve flotation in soft going.

5 TOUGH EXCLUSIVE "U.S. SAFETY BONDED CORD" construction: in which individual cords are "webbed" together—yet completely "insulated" one from the other, produces the strongest, longest lasting tire body possible.

6 TOUGH SHOCK PAD CONSTRUCTION: extra protection against ruptures and blowouts.



Specify Tough U.S. Royal Con-Trak-Tors For Lower Cost Per Mile

UNITED STATES RUBBER COMPANY

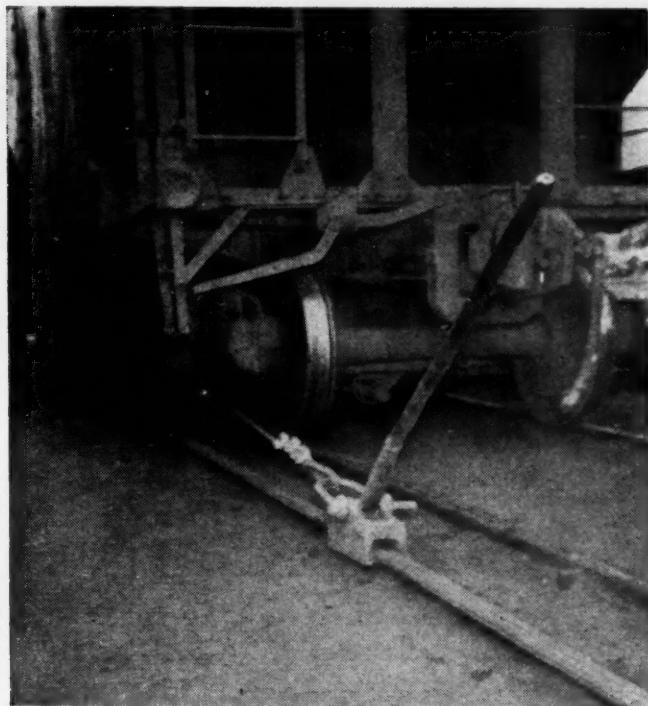


1230 AVENUE OF THE AMERICAS • ROCKEFELLER CENTER • NEW YORK 20, N.Y.

Car Retarder Operates From Third Rail



The car retarder is hooked to the car well down on the trailing truck.



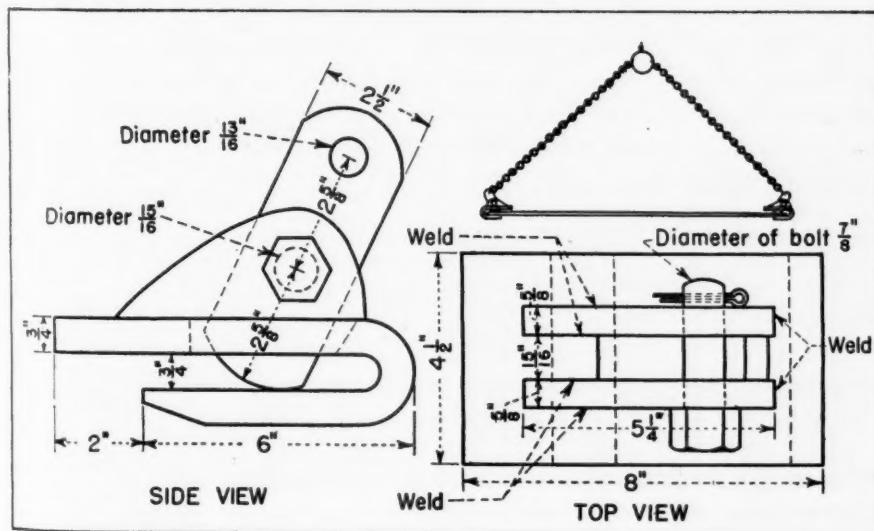
Only when the car is to be moved is it necessary for an attendant to be around.

A shoe and lever mechanism, riding on a third rail, provides a convenient way of dropping a coal car under the loading chute at Moss Hill No. 9 mine, declares A. L. Bishop, general superintendent, Hart-Ross Coal Co., Mortons Gap, Ky.

The car-retarding device, shown in the accompanying illustrations, is simple in construction. One man can manage the dropping of the car by himself. Raising the handle releases the grip on the rail and allows the car to roll forward. Pulling down

on the lever accomplishes the desired braking action. Once the car has been stopped the weight of the handle is sufficient to establish the gripping action necessary to hold the car at that position as long as it is necessary.

Special Tongs Help Move Sheet Steel



Self-wedging tongs and bridle chains save time in handling sheet steel with a hoist and also are safer, according to The Hudson Coal Co.'s Safety Commentator.

The tongs for handling sheet steel, shown in the accompanying illustration, were developed by Harold M. Beers, assistant superintendent of maintenance. This tong, using $3 \times 4 \frac{1}{2}$ -in. wide bar steel to form the clamp and $1 \frac{1}{8} \times 2 \frac{1}{4}$ -in. wide stock for the lifting bar which also wedges against the steel plate being lifted, is designed to handle heavy sheets up to $\frac{3}{4}$ in. Two lifting ears $\frac{3}{8}$ in. thick and spaced $1 \frac{1}{8}$ in. apart are welded to the clamp and are the ears between which the lifting bar pivots. Suitable bridle chains and lifting ring connect a pair of tongs together to form a complete operating unit.

Construction details of the lifting tongs and their arrangement to handle sheet steel.

Release Your Production **BRAKES...**



Production is too frequently slowed up by equipment failure . . . by long shutdowns for maintenance and repairs. Give your men Time Tested trouble free Cincinnati Chains, Bits and Cutter Bars.

Give Your Men **Trouble Free CINCINNATI CHAINS, BITS and CUTTER BARS . . .**

There is nothing more important today than dependable, trouble free equipment . . . Cutter Chains, Bits and Cutter Bars that hold up under tough production schedules. Cincinnati Chains are EXTRA TOUGH . . . chains that are engineered not only to reduce excessive wear and tear on the entire cutting machine, but which place the greatest wear on inexpensive easily replaceable parts. Machine runners and bosses alike praise their efficiency while maintenance men say they're practically trouble free. This means a minimum of maintenance and a maximum tonnage at a lower cost.



Easily replaced, hardened alloy steel Connector Insert gives fresh from the factory joint accuracy to worn connector.



Alloy steel, heat treated Rivet holds bearing pin against longitudinal displacement. Easily removed.



Hardened Eccentric Pin puts joint wear between pin and insert . . . doesn't turn in block. With replacement of pin and insert the joint is like new.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

News Round-Up



Government Signs With Foremen; No Immediate Change in Seizure Seen

The beginning of August found bituminous operators still "strangers to the operation" of their properties. Two and a half months after seizure, two months after conclusion of a wage and working-conditions contract with their workers in which they had no say, two months after resumption of normal production of over 12,000,000 tons weekly, the average operator could see no apparent move, or even any desire for such a step on the part of government officials, for the return of the mines to private ownership. Lewis obviously was quite happy over the situation, reportedly spending a part of the month of July on vacation, and making no effort towards setting up a workable contract, according to authoritative sources.

In fact, all factors pointed to even more and extended control of the mines by the government, and nothing had appeared that would indicate anything but continued and prolonged government operation. Of major concern to the industry was the signing by Coal Mines Administrator Admiral Ben Moreell July 17 of a contract with the union covering foremen and supervisors in four mines owned by the Jones & Laughlin Steel Co.

Jones & Laughlin Files Appeal

Signing of this contract came only a few hours after Jones & Laughlin had filed in the U. S. Court of Appeals for the District of Columbia a petition asking for an injunction preventing the coal mines administrator and the U.M.W.A. from completing such an agreement. A similar request for an injunction was denied June 25 by the Federal District Court for the District of Columbia on argument by government counsel that the steel company could in no way question or interfere with any action of the coal mines administrator since the government had all rights of proprietor. It was in argument of this case that the government counsel contended that in operation of any properties it seizes the government has the same authority to do with them as has any private proprietor and "no stranger to the operation"—the mine owner—has any standing in any court to challenge the method of operation.

The contract signed by Admiral Moreell covers almost 150 supervisory personnel in four Jones & Laughlin mines and is closely patterned on the Krug-Lewis agreement, with the notable difference that the means of obtaining a court test of the contract is

provided. Under the terms agreed, the union is bound to initiate court action if the company refuses to recognize the contract. According to the National Labor Relations Act, NLRB rulings can be tested in court only if a union files a complaint, and employers, therefore, cannot initiate court action on the NLRB decision that foremen constitute a legal bargaining group.

NLRB Court Test Soon

The contract states that the union will file against Jones & Laughlin "as soon as practicable" a charge of refusing to bargain, "to the end that the company may have an opportunity to obtain a final judicial determination of the rights of the supervisors at its mines under the National War Labor Act." The suit must be filed within ten days after a request by the coal mines administrator. Admiral Moreell may give notice to the union of his desire to have it file such a charge on or after Aug. 25. Once the company refuses to bargain, the issue would be shifted to the NLRB, then through the courts until a final decision is secured from the Supreme Court.

Other parts of the contract provide that should legislation be enacted to cover terms of employment for foremen, or if court decisions nullify or reverse present NLRB rulings, the coal mines administrator may end the agreement. If the administrator is enjoined from carrying out the agreement, the contract is to be null and void. The contract provides a wage increase of \$1.85 per day, retroactive to May 22, 1946.

In asking for an injunction against signing of the contract on July 17, attorneys for Jones & Laughlin contended that the government did not assume all property rights in seizing the mines and pointed to the "Regulations for Operation of Mines" governing the coal mines administration, which states as follows: "All properties in possession of the government shall be operated in a manner consistent with the fact that the title to the properties remains in the owners thereof and that the government, having temporarily taken possession or custody, will assert only such rights as are necessary to accomplish the national purpose of continued and maximum production."

The steel company's brief pointed out that under existing conditions the mines are operated and the employees are paid with the corporation's money and that under these regulations the company is

entitled to any profits made and must stand any losses incurred. They argue that under the National Labor Relations Act, the NLRB cannot qualify a single union as exclusive representative of both the rank-and-file laborers and the supervisors engaged in such a hazardous occupation as coal mining. They charge that the coal mines administrator is blocking the company's rights in accepting the NLRB certification of election as an "order."

Admiral Moreell on July 17 also signed two contracts covering clerical and technical workers, one for workers employed by Jones & Laughlin, and the other for those in the general office of the Industrial Collieries Corp., Johnstown, Pa., a subsidiary of the Bethlehem Steel Corp. The agreements, made with the United Clerical, Technical and Supervisory Workers, District 50, U.M.W.A., provided for wage increases of 18½c. per hour, retroactive to May 22.

Another step in the implementation of the Krug-Lewis agreement was announced July 26 with the issuance of the safety code covering government operation of the bituminous mines. Including more than 300 separate safety practices, the code was made effective almost a month after it was due. According to reports, issuance of the code was held up by the union's insistence that the operator's appeal clause be removed and that the code be issued in the form in which it was first completed on June 26.

Work on the health and welfare survey under Rear Admiral Joel T. Boone continued throughout the month. Preparation of the group's findings was reported under way, but issuance of the report was not expected until the latter part of August or early September.

Safety Code Announced By Government

A coal-mine safety code, drawn up under the terms of the Krug-Lewis agreement, was scheduled to go into effect in all coal mines under control of the government on July 29, according to an announcement by Secretary of the Interior Krug July 26. An order to begin enforcement was sent to all field offices of the Coal Mines Administration and copies of the new code also were being distributed to mine managers and the union.

Officially known as the "Federal Mine Safety Code for Bituminous and Lignite Mines of the United States," the safety standards cover practically every phase of operation and practice. The code was formulated by Dr. R. R. Sayers, director of the U. S. Bureau of Mines, with the Secretary of the Interior stated, the assistance of repre-

sentatives of the mine operators, the union and Admiral Morell's office. It will remain in effect, it was announced, as long as the government operates the mines under the Krug-Lewis agreement. Promulgation of the code was preceded by complaints from union leaders against delay and against certain provisions giving operators some leeway in objecting to provisions which they might contend affected production without promoting safety.

Inspectors of the Bureau of Mines will make periodic inspections of the mines and report all violations of the new standards to the Coal Mines Administrator through the Director of the Bureau of Mines, according to the code, with the Coal Mines Administrator charged with enforcement and correction of violations. Violations will first be called to the attention of the mine operating manager. If not eliminated promptly, the violation will be reported through the proper channels to the administrator. The operating manager can secure a review by appealing to the administrator, which was the principal provision objected to by union leaders. Upon petition, the administrator will investigate the case and render a decision. Described by the government as "a milestone on the road that leads to making American mines the safest in the world," the new code covers safety in timbering, blasting, explosives, ventilation, coal-dust hazards, transportation, electrification, protective clothing and many other phases of mine operation. Separate standards numbered more than 300.

Railroads Ask Coal Freight Rise

An emergency rise in recently increased freight rates to 15c. a net ton and 17c. a gross ton for all coal and coke was asked of the Interstate Commerce Commission July 8 by the nation's railroads. The OPA price increases on coal made since the freight increase approved by the Commission June 21 were cited by the railroads, and the request was made without prejudice in the case now being pressed before the Commission for a general 25-percent increase.

The Interstate Commerce Commission's order of Jan. 8 calling for reduction of 25c. per gross ton on anthracite haulage to tide-water was upheld by a special three-judge Federal court on July 12. The order, opposed by ten railroads serving the region, had been under a temporary restraining order until the appeal could be argued. In their decision the judges said there was indication that a general increase in rates was needed as argued by the railroads, but held that relief from the railroads' financial distress should not be placed on one commodity.

Gas-Turbine Locomotive Development Reported

One year's experimentation has demonstrated the feasibility of a railroad locomotive driven by a gas turbine powered by pulverized coal, members of BCR's locomotive development committee were told July 10 at a meeting in the Hotel Biltmore, New York, presided over by Chairman Roy B. White, president, Baltimore & Ohio R.R.

Coal Activity

Bituminous Coal Stocks

	Thousands	Net	P.c. Change
	Tons	From	From
	June 1, 1946	May 1, 1946	June 1, 1945
Electric power utilities...	9,949	-17.4	-21.1
B byproduct coke ovens...	2,565	-37.7	-42.1
Steel and rolling mills...	460	-24.2	-32.4
Railroads (Class I)...	6,201	-17.9	-33.8
Other industrials*...	10,761	-10.8	-16.8
Total.....	29,936	-17.8	-25.2

Bituminous Coal Consumption

	Thousands	Net	P.c. Change
	Tons	From	From
	May 1946	April 1946	May 1945
Electric power utilities...	4,585	-11.7	-23.3
B byproduct coke ovens...	3,647	-33.7	-53.6
Steel and rolling mills...	546	-27.1	-36.4
Railroads (Class I)...	7,904	-4.1	-26.1
Other industrials*...	8,345	-1.0	-29.4
Total.....	25,027	-11.0	-32.7

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

June, 1946, net tons.....	50,700,000
P.c. change from May, 1946.....	+148.2
January-June, 1946, net tons.....	235,190,000
P.c. change from Jan.-June, 1945.....	-20.9

Anthracite Production

June, 1946, net tons.....	3,636,000
P.c. change from May, 1946.....	-33.5
January-June, 1946, net tons.....	29,451,000
P.c. change from Jan.-June, 1945.....	-1.2

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Oil Burners
May, 1946.....	14,288	26,887
P.c. change from May, 1945.....	+102.2	+310.2
January-May, 1946.....	71,589	129,757
P.c. change from Jan.-May, 1945.....	+163.2	+343.2

Index of Business Activity*

Week ended July 27.....	183.3
Month earlier.....	175.8
Year earlier.....	214.0
*Business Week, Aug. 3	

Electric Power Output†

Week ended July 27, kw-hr.....	4,352,489,000
P.c. change from month earlier.....	+5.3
P.c. change from year earlier.....	-1.9
*Edison Electric Institute.	

The meeting was held to review the accomplishments of the locomotive research program initiated a year ago by Bituminous Coal Research, Inc., through the joint efforts of six major railroads and three coal-producing companies. In his first annual report, Dr. John I. Yellott, director of research, described the coal-handling system which makes use of the "coal atomizer" to pulverize coal to the necessary fineness within the limitations of space and weight imposed by railroad locomotives. He also described the use of small cyclone separators to remove 95 percent of the fly ash from hot gas streams which, freed from abrasive materials, may then be used to drive the turbine blades.

The Committee has authorized the purchase of two full-size gas turbines and locomotives in which to mount them, which are expected to be in operation within two years.

"The thermal efficiency of the gas-turbine locomotive at the rails is approximately 20 percent, as compared with that of the present steam reciprocating locomotive of 5 to 8 percent," said Dr. Yellott.

OPA Raises Coal Prices

On its first day under the new bill signed by President Truman July 26, OPA raised the price of coal to domestic consumers by 6c. or 8c. a ton, to cover the increase in freight rates that were effective July 1. All retail dealers who have to pay freight charges were authorized, effective July 26, to increase their ceiling prices by the exact amount of the increased freight charge allowed by the I.C.C.

Under the terms of the OPA extension bill, all coal ceiling prices are resumed as they were at midnight, June 30, on the expiration of the OPA. Prices between midnight, June 30, and July 26, when the new bill became law, are not governed by OPA ceilings.

Safety Awards Made In National Contest

Award of "Sentinels of Safety" trophies to the Rockhill No. 5 mine of the Rockhill Coal Co., Robertsdale, Pa., in the bituminous-mine group, and to the Butler mine of the Jermyn-Green Coal Co., Pittston, Pa., in the anthracite group, for outstanding records in 1945 in the 21st annual National Safety Competition, sponsored by the U. S. Bureau of Mines, was announced July 14 by Dr. R. R. Sayers, director.

In addition, four bituminous and four anthracite mines were awarded Certificates of Honorable Mention for working 30,000 or more man-hours without an accident or for ranking in the next four places after the winner in each group.

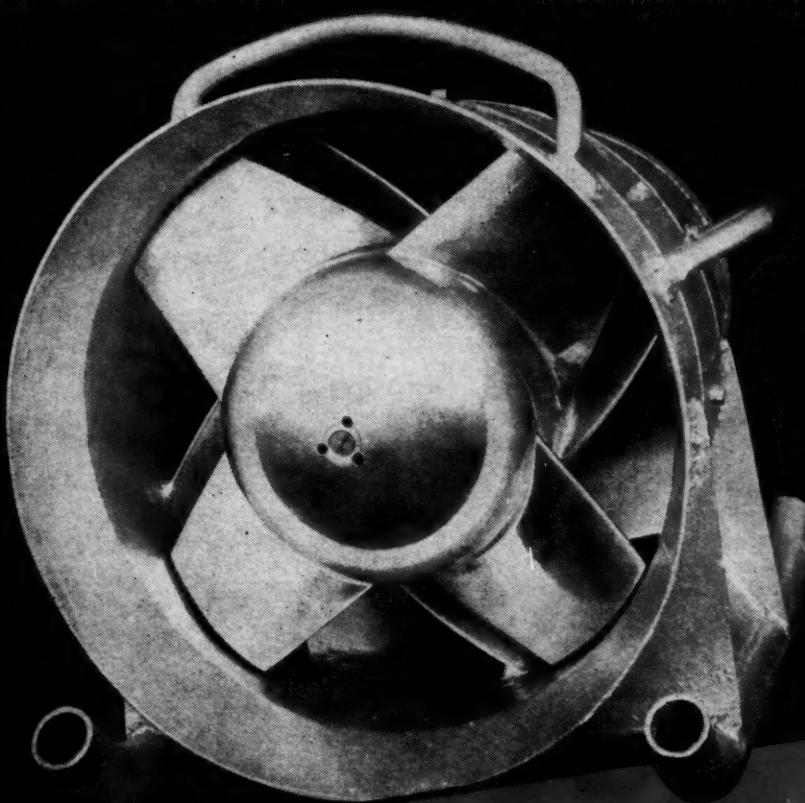
Interest in the 1945 competition was keen, Director Sayers reported to Secretary of the Interior Julius A. Krug, with 433 mines and quarries in 37 states and Hawaii participating in the contest for the bronze trophies donated each year by the Explosives Engineer. The competition was inaugurated in 1925 and is open to all mines and quarries in the nation.

At the Rockhill No. 5 mine of the Rockhill Coal Co., employees worked 289,924 man-hours with only one lost-time injury (54 days) and an extremely low severity rate of 0.186.

At the Butler mine of the Jermyn-Green Coal Co., employees worked 232,950 man-hours with 11 lost-time injuries causing 71 days of disability with a severity rate of 0.305.

Winners of certificates of honorable mention for outstanding safety records in anthracite mines were: Baltimore Tunnel mine, The Hudson Coal Co., Wilkes-Barre, Pa.; No. 6 mine, Jermyn-Green Coal Co., Pittston, Pa.; Ebervale mine, Jeddo-Highland Coal Co., Ebervale, Pa.; and Stockton mine, Jeddo-Highland Coal Co., Stockton, Pa.

Bituminous-coal-mine winners of the certificates of honorable mention were: Bankhead No. 2 mine, Consolidated Coal Co., Bankhead, Ala.; Patton Clay No. 1 mine, Patton Clay Mfg. Co., Patton, Pa.; Rockhill No. 1 mine, Rockhill Coal Co., Robertsdale, Pa.; and Midlothian mine, Blair Engineering & Supply Co., Dudley, Pa.



MODEL 1-16

4 bladed, single-stage
mine room blower

Portable Tubing Blowers

FOR AUXILIARY MINE VENTILATION

Operate quietly, efficiently, economically

La-Del Portable Tubing Blowers are Axial Flow designed—guaranteeing peak efficiency, high pressure air movement. They're exceptionally compact and are made in a range of sizes to meet all requirements. Portable La-Del Tubing Blowers for auxiliary mine ventilation. Portable La-Del wherever used, because of quietness and low power required. BULLETINS ARE AVAILABLE COVERING THE COMPLETE LA-DEL LINE... WRITE TODAY

La-Del pioneered the Axial Flow Principle

LA-DEL FANS

(TROLLER DESIGNED)

FEATURING AXIAL FLOW AERODYNAMICS



Consult a
Joy Engineer

LA-DEL Division

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

Safety, Preparation, Miner Morale Topics at Illinois Boat-Trip Meeting

Haulage accidents, coal washing and psychological factors affecting mechanized-mining efficiency were subjects discussed on the annual boat-trip outing of the Illinois Mining Institute, June 21 to 23.

Unfavorable clearance is a contributing factor to many, and the direct cause of a great part of all haulage accidents, said Claude Chapman, Bituminous Casualty Corp., in discussing "Haulage Safety in Bituminous Mines." In 1945, while the coal industry produced 630,615,000 tons, fatalities dropped from the 1944 rate of 1.91 million tons to 1.72, the lowest since 1870. Mr. Chapman cited records which indicated that approximately 44 percent of all fatal and non-fatal haulage accidents are caused by workers being struck, run over or squeezed between cars or locomotives. Most of these occur while coupling, pulling or pushing, switching, spragging or blocking the cars.

The second highest group of haulage accidents, accounting for an additional 23 percent, are squeezes between car and rib, timber or roof. Derailments and rerailing of derailments account for another 11 percent, leaving 22 percent resulting from miscellaneous causes. Coupling of cars alone caused 19.68 percent of the haulage accidents during the 8-year period of 1930 to 1937, he stated.

The lack of proper clearance is a factor that contributes to the cause of many haulage accidents. Conversion from hand loading to mechanical loading, involving installation of larger mine cars, often entails much expense just to provide adequate clearance. However, if clearance can only be provided on one side, added Mr. Chapman, it should be on the side opposite the trolley wire. The equipment should clear a person any place on the clearance side. In addition to this clearance feature, unobstructed refuge holes should be provided at regular intervals along the haulage road. Timber legs also should be recessed in the rib so they will not be knocked down by car derailments.

Mr. Chapman emphasized the need of good track with steep grades and dips modified, if not eliminated. Track switches should have automatic or parallel switch throws located on the clearance side of the roadway and car blocks and car stops were recommended for needed locations. He suggested that decks be provided at each end of locomotives for motormen and trip-riders, anti-climb bumpers be installed and rerailing devices and a jack be carried on each locomotive.

Density and size consist are two important factors to be considered when materials are to be washed, stated Raymond H. Bridges, Southwestern Illinois Coal Corp., in a paper on the "Washing Phase of Coal Preparation." The paper described the action of the Baum-type jig and the results secured in washing coal from Illinois Nos. 5 and 6 seams. The average density of Randolph County No. 6 seam delivered to the jigs ranges from 1.37 to 1.39, depending on the moisture content and the amount of high-density material being recirculated in the washing circuit. The density of the washed

product is between 1.34 and 1.36 when reduced to moisture conditions comparable to the feed. The density of the rejects ranges between 1.90 and 2.80.

Size consist, said Mr. Bridges, is a major factor in gravity concentration. As the average diameter of the particle decreases, the surface per unit of mass increases. The dynamic behavior of the particle is affected by its fineness, and it assumes a false density when immersed in a liquid. That the apparent density of the particle becomes less as its surface/mass ratio increases is shown by the decrease in the terminal-settling velocities of particles of like true densities but smaller diameters. An increase of surface causes a higher viscosity in the bed of water-solids

since the added surface presents friction in the interstitial areas. It has been observed in gravity concentration that unless the ratio of particle diameters is greater than 4.3 to 1 particles cannot be separated in any one constant velocity of current.

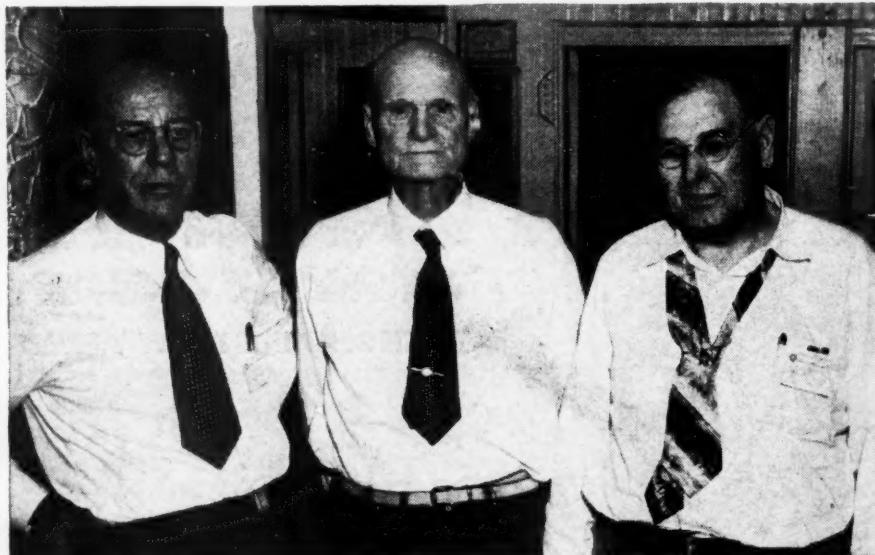
The three kinds of physical forces involved in the washing process, said Mr. Bridges, are: (1) the downward force of gravity, which acts on every particle in the system in relation to its mass; (2) the buoyant forces, acting upward, which arise from the force of gravity acting on the fluid; and (3) the forces of resistance, also acting upward, arising from the relative motion of the particles and the fluid, including forces resulting from interaction with neighboring particles through the medium of the fluid.

The density of the liquid-solids mixture in the jig is lowest when the solids and water are at rest. As extraneous forces in the form of interstitial pressures of the washing media are introduced into the bed, higher density

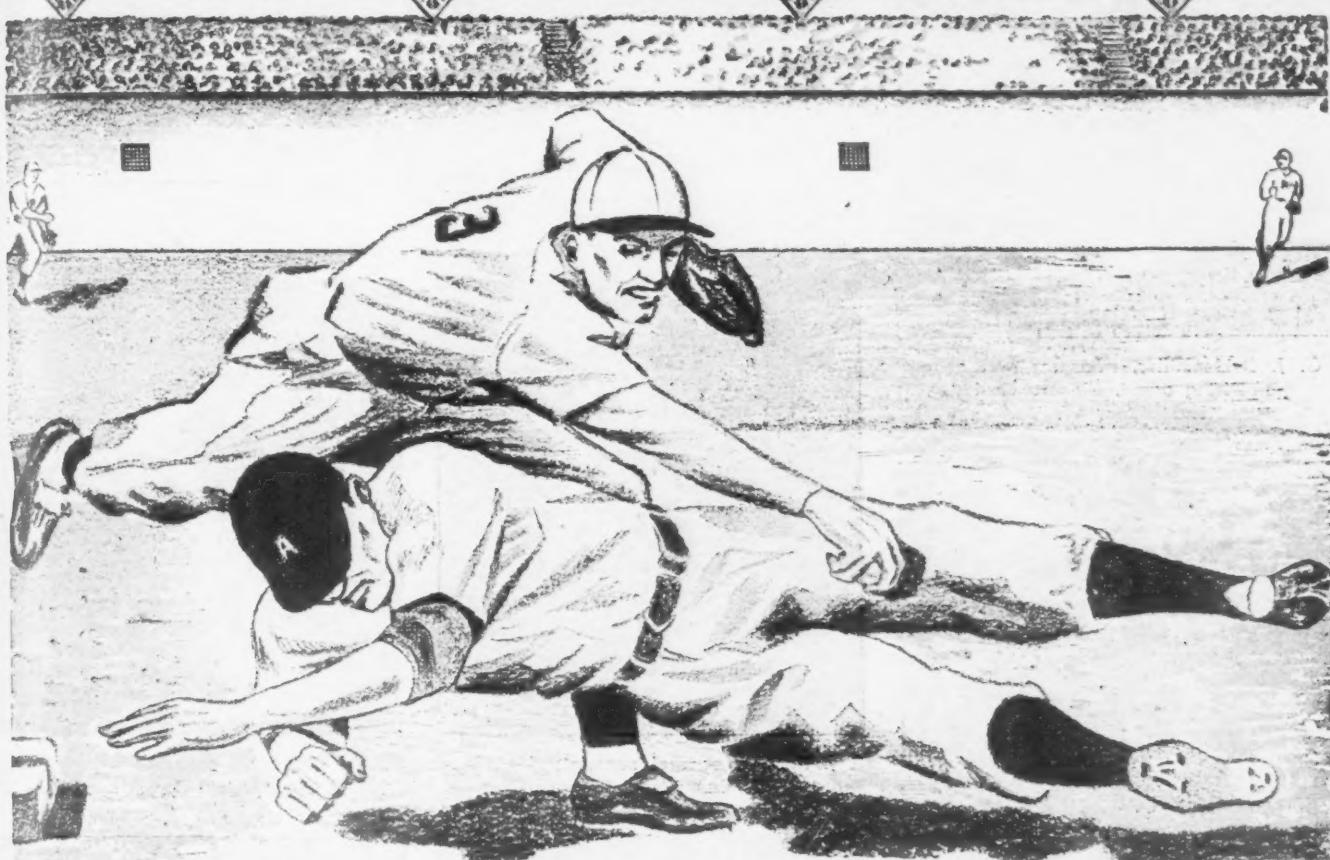
(Continued on page 122)



Officers of the Illinois Mining Institute pose aboard the steamer, "Golden Eagle," left to right: vice president, Robert M. Medill, director, Department of Mines & Minerals, Springfield, Ill.; president, Joe E. Hitt, Walter Bledsoe & Co., St. Louis, Mo.; and secretary-treasurer, B. E. Schonthal, B. E. Schonthal & Co., Chicago.



Snapped in the midst of discussion are, left to right: Joe E. Hitt, president of the Institute; Fred E. Weissenborn, Illinois Coal Operators Assn.; and R. A. Thompson, Kennametal, Inc.



In a Tight Spot!

In industry, as in baseball, dependable performance is what counts... that's why "HERCULES" (Red Strand) Wire Rope is so often called into play when a crucial job is at stake.

Its dependability is not a matter of chance, since its design and construction is the result of careful planning, diligent research, long experience and advanced manufacturing facilities.

You will never go wrong...no matter how "tight the spot" if you select "HERCULES" (Red Strand) Wire Rope. Being made in Round Strand and Flattened Strand construction - Preformed or Non-preformed, your requirements can always be filled - satisfactorily!

*Your inquiries are welcome
... and we invite them.*

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS

5909 KENNERLY AVENUE

NEW YORK 6 • • • 90 West Street
CHICAGO 7 • • 810 W. Washington Blvd.
DENVER 2 • • • 1554 Wazee Street

ESTABLISHED 1857

ST. LOUIS 12, MISSOURI, U. S. A.

SAN FRANCISCO 7 • • 520 Fourth Street
PORTLAND 9 • • 914 N. W. 14th Avenue
SEATTLE 4 • • • 3410 First Avenue South



G. J. Beidenmiller, treasurer and general purchasing agent, Glogora Coal Co., Huntington, W. Va.



W. F. Pioch, general manager, Glogora Coal Co., Blue Pennant, W. Va.



T. S. Cleveland (left), local purchasing agent, Mrs. Paul Lanye and Frank Shockey, Blue Pennant (W. Va.) mines, Glogora Coal Co.



Thomas Hughes, chief engineer, Blue Pennant (W. Va.) mines, Glogora Coal Co.



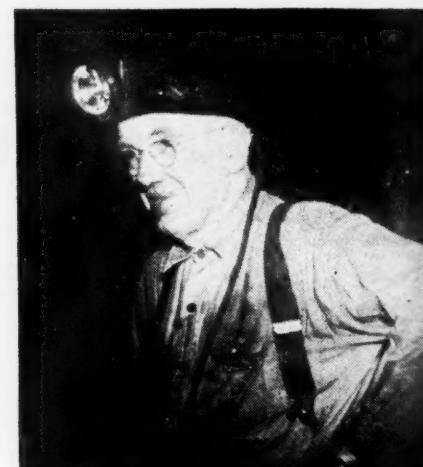
F. J. Hughes, general superintendent, Blue Pennant (W. Va.) mines, Glogora Coal Co.



Roy I. Kattman, mining engineer, Knox Consolidated Coal Corp., Bicknell, Ind.



A. L. Roberts, general superintendent, Franklin County Coal Corp., Inc., Herrin, Ill.



Robert Walker, section foreman, No. 16 mine, Glogora Coal Co., Blue Pennant, W. Va.



Sam S. Clark (left), superintendent, Williams River mine; Marvin L. Alley, general manager, and R. H. Massey, general superintendent, Gauley Mountain Coal Co., in the Williams River mine office, Cowen, W. Va.

ON THE JOB



Stanley T. Stokes, partner, Smith & Stokes Mining Co., Madisonville, Ky.



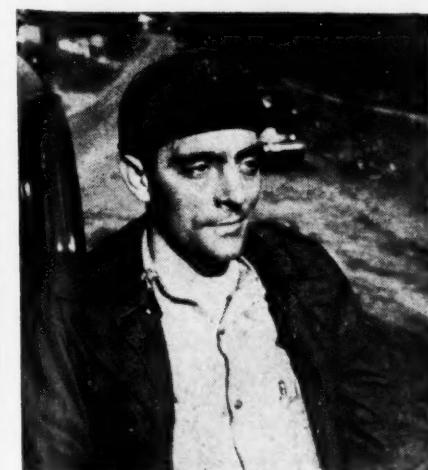
Ernest Hornsby, mine superintendent, Blue Pennant (W. Va.) mines, Glogora Coal Co.



William Hornsby, mine foreman, Blue Pennant (W. Va.) mines, Glogora Coal Co.



F. H. Snyder, chief electrician, Blue Pennant (W. Va.) mines, Glogora Coal Co.



Fred Hubbard, superintendent, Peerless Darby Coal Co., Splint, Ky.



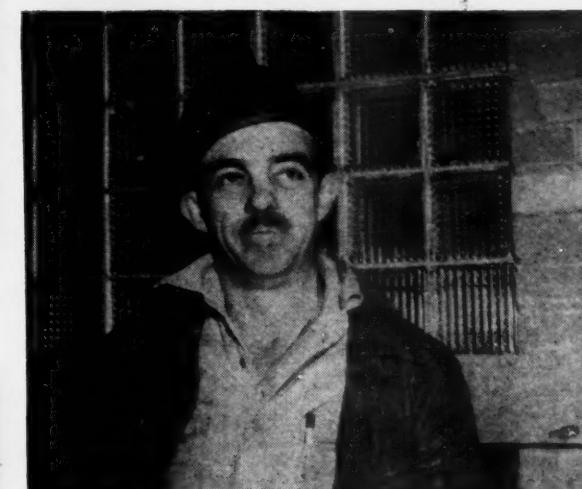
Peb G. Conrad, general manager, Knox Consolidated Coal Corp., Bicknell, Inc.



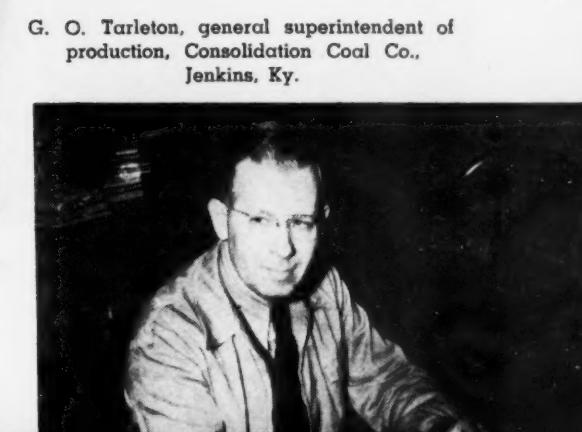
W. R. Pioch (left) and Robert Senze, engineers, Blue Pennant (W. Va.) mines, Glogora Coal Co.



Walter E. Buss, construction engineer, Knox Consolidated Coal Corp., Bicknell, Ind.



L. C. Clarke, outside foreman, Blue Pennant (W. Va.) mines, Glogora Coal Co.



G. O. Tarleton, general superintendent of production, Consolidation Coal Co., Jenkins, Ky.

conditions result as particles become suspended in the media. When solid particles are placed at random in the washing media they sink either until they have displaced a volume equal to their mass, or until they have both displaced their volume and used up the kinetic-energy potential because of position and density differential. This kinetic-energy potential is absorbed by the washing media and is manifest in the form of turbulence or rising currents of water with pressures equal to the loss of relative density of the surrounding particles.

For maximum size-range separation, concluded Mr. Bridges, we need to keep the highest density washing medium. This point occurs when the volume of the interstices is at the lowest point that can be reached with a packing composed of the size range being washed.

The work attitude of the machine operator and other workmen, the state of mind of the foreman, and the intelligence and disposition of top management all affect production, said James Hyslop, vice president in charge of operations, Hanna Coal Co., in a paper entitled "Psychological Factors Affecting Mechanized-Mining Efficiency." Economic pressure, he said, will compel the abandonment of manual methods in coal production wherever mechanization is possible, and it also will provide the incentive needed to insure progress in the improvement of machines and mining systems. Time studies show that machines can do more, but their output is controlled by psychological factors. A workman's thinking may influence his productivity 50 percent or more. Today, high worker efficiency is accompanied by a cheerful friendly attitude

on the part of both worker and management, for the hard-taskmaster method no longer produces results.

Mr. Hyslop listed six prerequisites for successful operation and commented on each as follows: (1) Management must know the maximum potentialities of its men and machines. (2) The will to produce must be developed within management personnel. This will cannot be fostered by means of threatening measures. (3) Every member of management should be made to realize his obligation to ownership. (4) Belief in the profit motive is fundamental. Every member of management has a right to expect that achievement on his part will be rewarded by an increase in his compensation. (5) Work attitude within a management organization must be built on mutual respect between superiors and subordinates. And



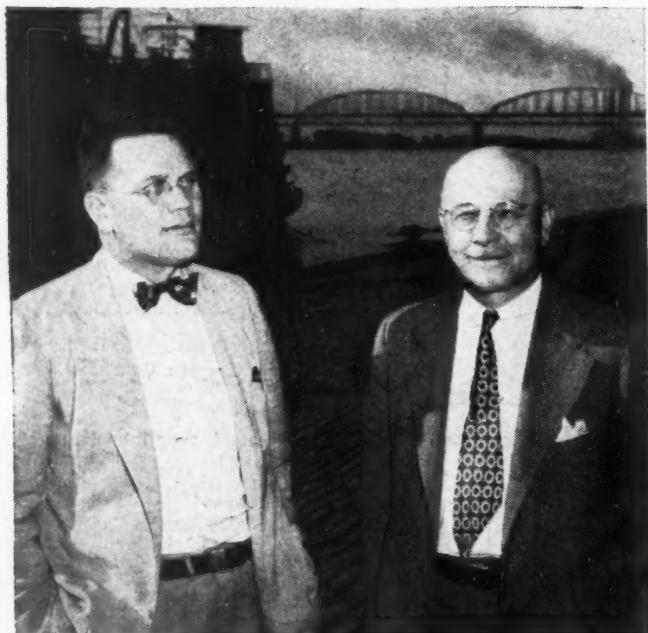
Raymond H. Bridges, Southwestern Illinois Coal Corp., discussed coal washing.



Claude Chapman, Bituminous Casualty Corp., spoke on haulage safety.



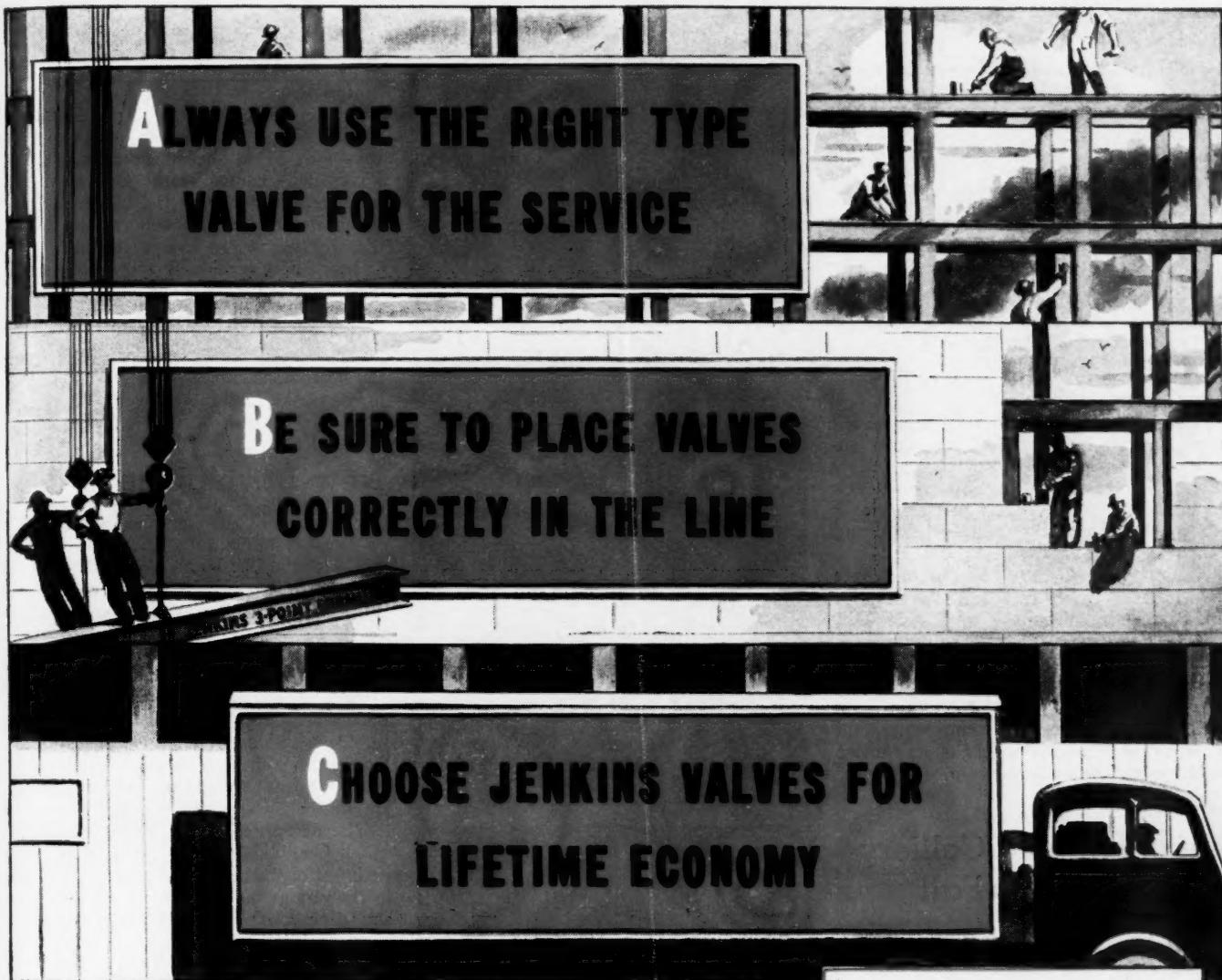
Dean Charles M. Thompson, University of Illinois (retired), arrives at the dock.



Prof. Harold L. Walker (left), Department of Mining & Metallurgical Engineering, University of Illinois, and Dr. M. M. Leighton, chief, Illinois State Geological Survey, get together on the dock.



J. W. Starks (left) division superintendent, Peabody Coal Co., Springfield, Ill., and W. J. Jenkins, president, The Consolidated Coal Co., engage in some apparently not-too-serious conversation.



Getting down to earth on valve costs

The real cost of a valve depends on three factors — selection of the right pattern and metal, installation with proper care in the right location, and choice of the valve best engineered for endurance. That's why more and more plants have adopted the Jenkins 3-Point Formula as their buying guide in new construction or renovation.

By choosing Jenkins Valves you get valves made with *extra endurance* which assures *extra economy*. You also get expert advice on the selection and placement of valves from top-rated valve specialists, Jenkins engineers, whenever you need it. Base your valve buying on the 3-Point Formula. Make sure of the *extra value* that means *lowest cost in the long run*.

Jenkins Bros., 80 White Street, New York 13; Bridgeport; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal; London, England.

LOOK FOR THIS  DIAMOND MARK

SINCE Jenkins Bros. 1864

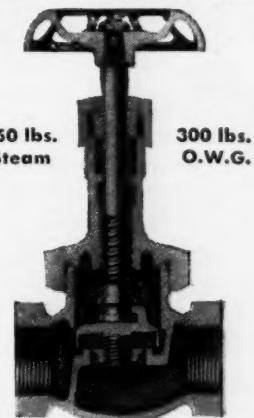


JENKINS VALVES

For every Industrial, Engineering, Marine, Plumbing, Heating Service... In Bronze, Iron, Cast Steel and Corrosion-resisting Alloys... 125 to 600 lbs. pressure.

Sold Through Reliable Industrial Distributors Everywhere

JENKINS FIG. 106-A
Renewable Composition Disc
BRONZE GLOBE VALVE



A renewable composition disc valve. Fig. 106-A features a convenient slip-on stay-on disc holder that permits a quick change of disc. The resilient Jenkins composition disc assures drop tight closure with least closing effort. The bevel joint between the body and bonnet serves as an internal brace and resists the crushing effect of the body assembly.

ONE OF OVER 600 EXTRA VALUE VALVES
MADE BY JENKINS VALVE SPECIALISTS

(6), the eye must be kept on the ball—production.

High productivity and good housekeeping, he added, go hand in hand. And safety is not to be forgotten. A management organization capable of making a mine produce is always capable of making it safe. One pitfall on the road to efficiency lies in the temptation to permit machines to be operated below their potential capacity. The production cycle should not be geared to the production of the slowest unit.

Miners' Homes Sold by Coal Company

Auction of land on which are located approximately 1,000 miners' homes was announced early last month by the New River Co., Mt. Hope, W. Va. The property is to be sold in five units, as the company is not prepared to handle individual sales, and bids were to be received until July 18.

Commenting on the trend toward private ownership of homes in the mining industry and the desire of miners to acquire their homes, L. Ebersole Gaines, New River president, said: "If these folks want their own homes, we don't want to stand in their way. This plan will offer low-cost housing for a lot of people." New River employs around 3,000 miners, more than half of whom live in homes not owned by the company.

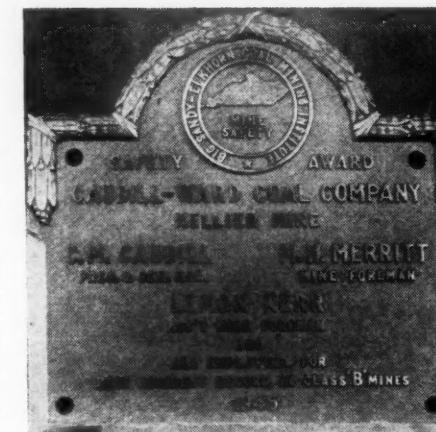
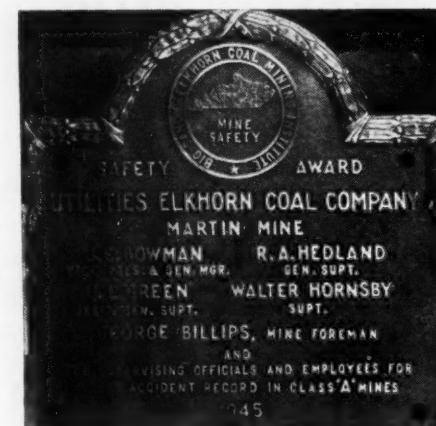
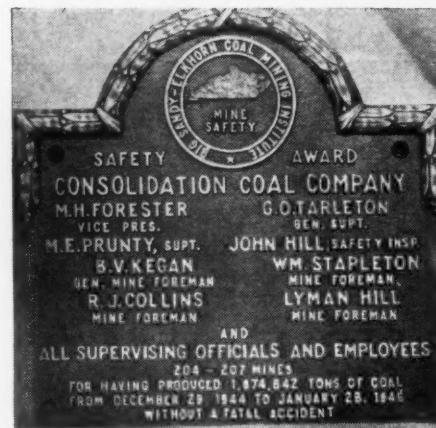
Nesquehoning Colliery To Be Closed in Fall

Closing of the Nesquehoning colliery, Nesquehoning, Pa., on expiration of the lease next October, because of high operating costs, was announced July 18 by James H. Pierce, president, Edison Anthracite Coal Co., operators of the property. One of the oldest anthracite collieries in the region, the mine produces 8,000 tons daily and has been operated continuously for almost 100 years. The Edison company has leased the property from the Lehigh Navigation Coal Co. since 1939. John Caden, president of the local union, was to meet with Lehigh Navigation officials in an effort to keep the mine open. F. E. Sterner, newly appointed production engineer of the Lehigh Navigation Coal Co. was named by the company July 25 to study the colliery's operation.

Kentucky Mines Receive Safety Plaques

Consolidation Coal Co., Caudill-Ward Coal Co. and Utilities Elkhorn Coal Co. were recipients of bronze-plaque awards for outstanding 1945 safety records at the June meeting of the Big Sandy-Elkhorn Coal Mining Institute at Pikeville, Ky. Mine No. 204-207 of the Consolidation Coal Co. (now Consolidation Coal Co. of Kentucky) received its plaque for producing over 1,000,000 tons (1,674,842) during the year without a fatal accident.

Martin mine of the Utilities Elkhorn Coal Co., in the Class A mines (larger producers) mined 292,241 tons with a frequency rate



of 24.55 and a severity rate of 0.310. Helli mine of the Caudill-Ward Co., in the Class B group, produced 114,389 tons without a lost-time accident.

Two more plaques will be awarded as soon as they can be secured, one to Weeksburg mine, Koppers Coal Division, for producing 1,025,627 tons without a fatal accident, and the other to the Wheelwright mine of the Inland Steel Co. for mining 2,000,221 tons without a fatal accident.

For a number of years the Big Sandy-Elkhorn Coal Mining Institute has been awarding these plaques to mines of its member companies for outstanding safety records. Officers of the institute are: president, Edgar Dale, Elk Horn Coal Corp., Wayland; first vice president, M. M. McCormick, Consolidation Coal Co. of Kentucky, Van Lear; second vice president, Arthur Bradbury, Inland Steel Co., Wheelwright; third vice president, Fred Sherman, North East Coal Co., Thealka, and secretary-treasurer, A. D. Sisk, Pikeville.

Birtley Named To Anthracite Fund

Robert Birtley, president of the Hammond Coal Co. of Girardville, Pa., and the Kohinoor Co., West Shenandoah, Pa., was July 23 officially named as the anthracite operators' representative on the board that is to administer the welfare fund set up by the recently negotiated union contract. John O'Leary, vice president, and Thomas Kennedy, secretary-treasurer of the U.M.W.A., had already been named by the union to represent the miners. Mr. Birtley, a veteran of 30 years in the anthracite industry, was the unanimous choice of the operators. Payments to the fund are to begin Aug. 15.

New Developments

Formation of the Consolidation Coal Co. of West Virginia as a wholly owned subsidiary of the Pittsburgh Consolidation Coal Co. to take over that company's operations in West Virginia, effective July 1, was announced last month.

William L. Doolittle, of Fairmont, is president of the new firm. Other officers are: George R. Higinbotham, vice president, operations; Charles V. Lucas, assistant to the president and assistant secretary; Elmus R. Snodery, treasurer; Edward J. Berlin, auditor and assistant treasurer; and Orville C. Ankrom, chief engineer.

The new subsidiary is in line with Pittsburgh Consolidation's previously announced policy of decentralizing its mining operations in the various states. Formation of the Consolidation Coal Co. of Kentucky was announced June 27.

A group of Northern West Virginia businessmen are reported to be considering opening a new coal field, said to contain 2,000 acres of coal, in the Elk and Union districts of Barbour County and the northern part of Elk district of Harrison County, West Virginia.

The work under consideration includes construction of six miles of railroad extending from the present B. & O. tracks at Berryburg, construction of a 2,000-ft. tunnel and several small bridges, and the start of several new coal-mining operations. Preliminary surveys for the railroad line are under way.

Development of extensive coal deposits in Wise County, Virginia, owned by the Clinchfield Coal Corp., Dante, Va., was expected to begin by the end of the year, as construction began last month on the 14-mile branch line of the Chesapeake & Ohio R.R. from Jenkins, Ky., through the Cumberland Mountains to Bowl Camp, Va. The new line requires building of a mile-long tunnel through the mountains. Another line, already under construction for several months, is being built into the territory for the Carolina, Clinchfield & Ohio R.R. Extending 15 miles from Freemont, Va., it will terminate within a few miles of the end of the new C. & O. line.

Re-opening of the Panther Creek Mine No. 2, near Springfield, Ill., owned by the Panther Creek Mines, Inc., was under consideration last month as a crew, under supervision of Warren P. Rose, vice president of the company, began clean-up work. Closed since March, 1945, the mine previously em-

RAISE YOUR PAYLOAD CEILING .. and PROFIT!

**Haul with
WALTER
TRACTOR TRUCKS**



WALTER FOUR POINT POSITIVE DRIVE

Automatically Adapts Itself to Every Surface Condition

The exclusive Walter Four Point Positive Drive eliminates wheel spinning and bogging down on slippery surfaces and soft ground. Three automatic locking differentials proportion the power to the FOUR driving wheels according to the traction of each wheel at any instant. Thus, full tractive effort is constantly maintained, even when riding surfaces vary from wheel to wheel. No other truck does this!

SUSPENDED DOUBLE REDUCTION DRIVE

Provides high ground clearance and larger gear capacity. A solid axle forging protects the vital driving mechanism against high crowns, rocks and stumps.

OTHER FEATURES

Engine-ahead-of-wheels design shortens the wheelbase and correctly distributes the weight. Thus, the truck can maneuver easily and quickly. Hydraulic steering and air brakes contribute to safety and ease of handling. Tractor Type Transmission affords ample gear ratios for any emergency. Choice of engines to 300 h.p.; Gasoline, Diesel or Butane.



• 20 - TON WALTER DUMPER
ideal for hauling mine waste.
Compact, easily maneuvered,
navigates any surface, climbs
sharp grades.

• WALTER TRACTOR
TRUCK with 30 ton bottom
dump trailer. Hook two
trailers in tandem to haul
60 tons per trip.

USING small or medium trucks on your pit-to-plant run, may be robbing you of real profits. Consider how much you could increase tonnage per truck, per day, if you hauled big payloads as fast as you now haul smaller ones. Fewer trucks would maintain plant capacity—saving you initial cost, upkeep and maintenance—leaving *more for profit*.

You can do it with WALTER TRACTOR TRUCKS. Why? Because they have the power and traction to speed enormous loads over rugged terrain. Their exclusive Walter Four Point Positive Drive maintains full HAULPOWER all the time—regardless of running conditions. Their unique combination of driving features provides unequalled handling ease, enables them to negotiate sharp curves and reduces maneuvering at pit and plant. From tread to top, they are built to save you money. Write for the complete story of Walter Tractor Trucks.

Walter Motor Truck Co.

1001-19 Irving Avenue

Ridgewood 27

Queens, L.I.,

N.Y.

WALTER TRACTOR TRUCKS

800 RPM
Reciprocating Action
 FOR FLAT SCREENING



— yet the Red Elastic Collar
 protects permanently against VIBRATION

Vibration — set up by an 800 rpm eccentric drive with a 1" throw — made every bolted connection a trouble spot on the Symons Type F Screens. Other conventional fasteners failed on the full floating drive, screening and balancing decks and 'grizzly'. ESNA Elastic Stop Nuts held permanently! — just as they have held permanently against vibration on other equipment for fifteen years.

ESNA Elastic Stop Nuts are self-locking, easily removable, and reusable over and over. They protect permanently against Vibration, Corrosion, Thread Damage, Liquid Seepage and Costly Maintenance.

Here's a challenge: Send us complete details of your toughest bolted trouble spot. We'll supply test nuts — FREE, in experimental quantities. For further information or literature address: Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives and Agents are located in principal cities.



The RED ELASTIC COLLAR
 —denoting an ESNA product

... is threadless and permanently elastic. Every bolt — regardless of commercial tolerances — impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads — and eliminates all axial play between bolt and nut threads.

All ESNA Elastic Stop Nuts — regardless of size or type — lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.



ELASTIC STOP NUTS



INTERNAL
 WRENCHING



ANCHOR



INSTRUMENT
 MOUNTING



SPLINE
 CLINCH



GAN^G
 CHANNEL

PRODUCTS OF: ELASTIC STOP NUT CORPORATION OF AMERICA

MEETINGS

- Southern Appalachian Industrial Exhibit: sponsored by the Pocohontas Electrical and Mechanical Institute, Aug. 22, 23 and 24, Bluefield, W. Va.
- Eighth University of Illinois Conference of Coal Utilization: Sept. 17-19, University of Illinois campus, first meeting since 1941.
- Kanawha Coal Operators' Association: annual meeting Oct. 17, Charleston, W. Va.
- Joint Fuel Conference of the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers: Oct. 24-25, Bellevue Stratford Hotel, Philadelphia.

ployed 154 miners.

Tasa Coal Co. is reported to have opened a new strip mine near Zelienople, Beaver County, Pa.

The Ohio Power Co. is reported to be offering for sale various farm buildings near Cumberland, Ohio, in Brookfield township, preparatory to the early start of strip-mine operations on the farms. The company is said to have 8,500 acres of land, either optioned or purchased, in this area, mostly south and east of Cumberland.

A new coal field that may prove one of the richest in the state was being investigated late last month near Florence, Colo., after well drillers reported striking two veins of coal on land 12 miles south of Florence owned by the city. Early tests indicated that the coal is of a semianthracite grade but the pitch of the veins had not yet been determined. City officials were said to be considering leasing the land for mining on a royalty basis and were to meet Aug. 5 to determine final action.

Coal's Case Presented At FPC Gas Hearings

Hearings in the general natural gas investigation before the Federal Power Commission continued in July, with representatives of the coal industry concluding several weeks of testimony.

Important points made by coal-industry witnesses included: (1) natural gas reserves at the present rate of use could be exhausted by 1955; (2) natural gas is being put to uneconomical use; (3) the FPC should have the power to regulate the maximum and minimum selling prices of natural gas and to limit the uses to which it may be put; (4) coal-fired stokers for industrial uses are cheaper than natural gas in many instances, based on actual cost figures from many large industrial installations; (5) competition of natural gas with coal plus the declining rate of production of natural gas in Illinois had worked hardships on communities in that State; (6) natural gas is an inefficient fuel for the generation of electricity; and (7), the Appalachian area after 1952 will have to

look to the Southwest for its natural-gas supply.

An exhibit put into the record by the National Coal Association revealed that the aggregate capacity of natural-gas pipelines for which applications are now pending before the FPC exceeds the equivalent of 48,000,000 tons of bituminous coal per year.

Representatives of the California Public Service Commission stated that California's reserves of natural gas were rapidly being depleted despite rigid State control and urged adoption of an effective policy to conserve the nation's gas resources.

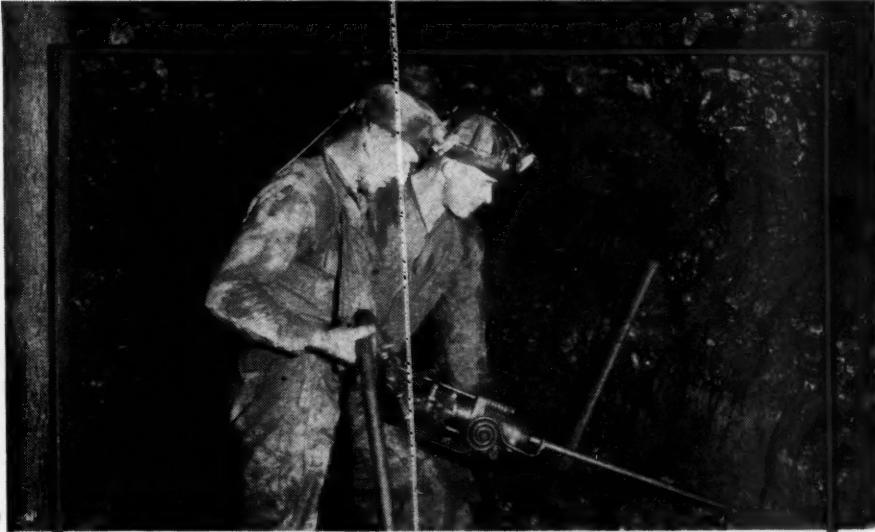
On July 18 the War Assets Administration announced that it had received seven bids to buy and three to lease the "Big" and "Little Inch" pipelines. All but two of the proposals were for use of the lines to transport oil, which the WAA views as in accord with the policy recommended to Congress by the former Surplus Property Administration. The other two bids called for conversion of the lines to natural-gas transportation. All bids were to be opened and publicly read on July 31.

Further extension of natural-gas service was approved recently in an order by the Federal Power Commission granting authority to the East Ohio Gas Co. to construct and operate a 144-mile pipeline, at an estimated cost of \$4,620,000. Serving 69 Ohio communities, the line will have an initial capacity of 119,000,000 cu.ft. of gas daily, which is equivalent to 1,782,168 tons of bituminous coal yearly.

The Federal Power Commission also recently announced approval of several additional enlargements of natural-gas service. The Hope Natural Gas Co. of Clarksburg, W. Va. was authorized to add 143 miles of pipeline to its present system. Estimated cost of the new facilities will total \$5,327,500 and will increase the company's present capacity by 119,000,000 cu.ft. daily, equivalent to 1,782,168 tons of bituminous coal yearly. Authority also was granted to the Cincinnati Gas Transmission Co. to construct 70 miles of 14-in. natural-gas pipeline for an increase of 50,000,000 cu.ft. in daily capacity, equal to 748,810 tons of bituminous coal annually. The FPC has approved the application of the Tennessee Gas & Transmission Co. to construct new pipeline and compressor facilities enlarging its capacity by 277,000,000 cu.ft. daily, for sale in the Appalachian and other areas.

The United Gas Pipe Line Co., Shreveport, La., has received approval on construction of additions to its main pipelines in Mississippi and Louisiana, which serve industrial and wholesale consumers in Texas, Mississippi, Alabama and Florida. Capacity will be increased by 83,950,000 cu.ft. daily, equal to 3,445,000 tons of coal per year. Construction by the Southern Natural Gas Co. of Birmingham, Ala., of 80 miles of 16-in. pipeline to supply natural gas to communities in Alabama and Georgia has been approved. Cost of the project is \$2,608,000.

An amended application has been filed with the FPC by the Mid-Continent Gas Transmission Co., seeking authority to construct two 26-in. natural-gas lines 400 miles long to Kansas City, Mo., and one 26-in. pipeline 436 miles long from Kansas City to a point near St. Paul, Minn. Total initial cost would be about \$80,000,000, and by the fifth year the project is expected to handle around 550,000,000 cu.ft. of gas



SCHRAMM AIR COMPRESSORS FURNISH ALL THE AIR YOU NEED IN MINE WORK!

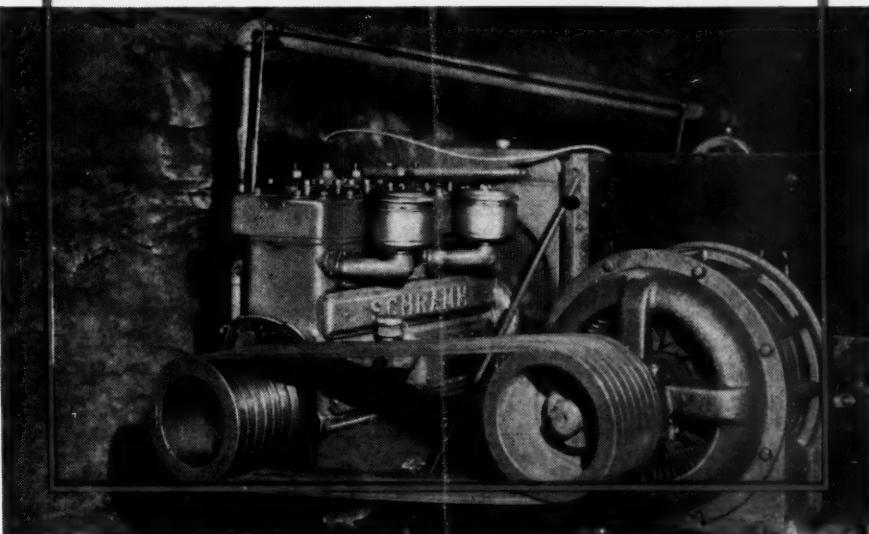
The versatility of Schramm's Air Compressors—both portable and stationary—makes them the all-round air compressor for your mine!

Schramm Air Compressors are designed for heavy duty, continuous service, with minimum attention. They are built in sizes ranging from 20 to 600 cu. ft. displacement, in every type of mounting and assembly.

Illustrated is a Schramm installation deep in a mine. This compressor—as all Schramms—is 100% watercooled, compact and lightweight, and has mechanical intake valve and forced feed lubrication.

Make your mining easier by using Schramm Air Compressors. Write today for construction details on these compact, sturdy units.

SCHRAMM INC. THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA





Both are tough... but ONE is tougher!

WHICH WILD BOAR survives when both are so powerful? The one with the *extra* strength, of course.

WHICH WIRE ROPE holds out longer under the strain of constant operation? The one with the *extra* strength, of course.

ROCHESTER WIRE ROPES are *extra* strong because of something *extra* in the men who make them (skill and care) . . . something *extra* in the materials they're made with (certified high quality) . . . something *extra* in the manufacturing methods (best by the test of experience) . . . something *extra* in the machines they're made on (the most modern in the wire rope industry). Extra strong Rochester wire ropes in all sizes, types, grades and constructions are available for prompt shipment. Rochester Ropes' engineers can advise you on your special problems of wire rope selection, use and maintenance.



LOCKED-IN LUBRICATION is forced by air pressure between individual wires. This process requires twice as much lubricant as is absorbed by other methods . . . protects against internal friction caused by rope passing over sheaves . . . assures longer life and better service from wire ropes made by Rochester.

ROCHESTER *Ropes*

CULPEPER, VIRGINIA

Branch Offices & Warehouses: Birmingham, Houston, Jamaica, N. Y., San Francisco

EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in June, as follows:

Joy Mfg. Co.—Type PL11-10RPE/F elevating conveyor; 10-hp. motor; 250 and 500 volts d.c.; Approvals 557 and 557A, respectively; June 4.

Westinghouse Electric Corp.—Westinghouse - Whitcomb, 900-mm., 9-metric-ton storage-battery locomotive, for foreign service; Approval 1537; June 11.

daily, equivalent to 8,000,000 tons of coal yearly.

The Kansas Power & Light Co. has asked the FPC for authority to abandon and remove certain facilities now used in delivering natural gas to the Kansas-Nebraska Natural Gas Co., the Cities Service Gas Co. and the Northern Natural Gas Co., capacity of which totals 5,000,000 cu.ft. daily. The company states that its present reserve will last ten years if the discontinuance of service is made.

BCR Annual Meeting Reports Coal Research

Intensive research, which is providing solutions to many of the bituminous coal industry's problems, was outlined during the annual meeting of Bituminous Coal Research, Inc., June 28, in Cleveland, Ohio, and at the conference of the BCR technical advisory board held June 29.

Fifteen speakers reported the accomplishments that science and technology are making possible in the improved utilization of the nation's most abundant fuel as approximately 200 coal company executives and engineers assembled for the meeting. Howard N. Eavenson, president of BCR, presided. He announced that subscribers of the research agency had voted to set up BCR as a non-stock, non-profit corporation.

Seven members of the board of directors were re-elected as follows: Howard N. Eavenson, Pittsburgh; B. R. Gebhart, Chicago, vice president, Chicago, Wilmington & Franklin Coal Co.; W. C. Hull, Cleveland, vice president, Chesapeake & Ohio R. R.; J. B. Morrow, Pittsburgh, vice president, Pittsburgh Consolidation Coal Co.; M. L. Patton, Cincinnati, vice president, Truax-Traer Coal Co.; K. A. Spencer, Kansas City, president, Pittsburgh & Midway Coal Mining Co.; and R. D. Stockdale, Columbus, pres., Red Jacket Coal Sales Co.

Directors already elected, having been named by the National Coal Association, were: E. H. Davis, Columbus, president, New York Coal Co.; H. A. Glover, Huntington, W. Va., vice president, Island Creek Coal Sales Co.; Ralph E. Jamison, Greensburg, Pa., president, Jamison Coal and Coke Co.; S. S. Nichols, New York, vice president, C. H. Sprague & Son Co.; D. H. Pape, Monarch, Wyo., president, Sheridan-Wyoming Coal Co., Inc.; C. J. Potter, Indiana, Pa., assistant to president, Rochester & Pittsburgh Coal Co.; R. H. Sherwood, Indianapolis, president, Central Indiana



**That's
Where V-Belts
Get All the WEAR!**



V-Belt in Sheave

Clearly, it's the sides of a V-Belt that do all the gripping on the pulley and get all the wear against the sheave-groove wall. That's why longer life for the sides means longer life for the belt!

—and that's **WHY** the
CONCAVE SIDE is **IMPORTANT!***

Examine a hundred—or a thousand—worn-out V-Belts and here is what you will find—

Almost without exception, it is the sidewall of the belt that has worn out first. There is a perfectly natural reason for this—and every man who works around machinery knows it.

It is the *sidewall* of a V-Belt that has to *grip* the pulley and *drive* it. It's the sidewall that *transmits* to the pulley all the power the pulley ever receives. No other part of the belt gets anything like the *actual* wear the sidewall gets. Is it any wonder the sidewall of the *ordinary* V-Belt is the part that wears out first? And when you prolong the life of the sidewall you naturally prolong the life of the belt!

The simple diagrams on the right show clearly why the ordinary, *straight-sided* V-Belt gets excessive wear along the *middle* of the *sides*. They show also why the Patented Concave Side *greatly reduces* sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight sided V-Belts can possibly give.

Straight Sided V-Belt



How Straight Sided V-Belt Bulges When Bending Around Its Pulley



You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall



Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit In Sheave Groove When Belt Is Bending Over Pulley



No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

*More Important NOW Than Ever Before.

Now that Gates Specialized Research has resulted in V-Belts having much stronger tension members—tension members of Rayon Cords and Flexible Steel Cables, among others—the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important today than ever before!

468

Gates
THE MARK OF SPECIALIZED RESEARCH

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

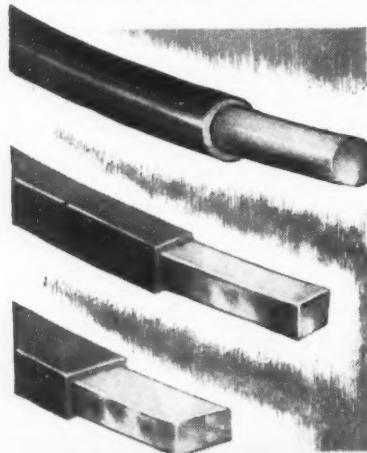
WHERE **motor overwork**
IS THE RULE . . .



cut the risk of another burnout . . .
rewire with Deltabeston* magnet wire

When you have to rewind a motor—*make the most of it*. Rewind it, or specify that it be rewound with Deltabeston magnet wire—the outstanding Class B asbestos-insulated magnet wire. You'll be sure of extra service life in spite of the heat that comes with overwork.

Burnouts that interrupt production cost big money. Rewinding costs are high, too, as compared with the small extra investment you make in rewinding with this life-lengthening magnet wire. What's more, your rewound motor won't have to be pampered. It can go back in a "key" spot where service conditions are extra severe.



Deltabeston magnet wire is made in shapes and sizes interchangeable with regular double-cotton insulated wire. Its soft copper conductor and flexible covering permit winding of intricate shapes without difficulty. Its pure felted asbestos, impregnated with a heat-resisting bonding agent, makes light of temperatures up to 200 C.

For more facts on Deltabeston and its application, write Section Y-11-8-10, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn. All Deltabeston asbestos, glass and synthetic wires are distributed nationally by G-E Merchandise Distributors.

*Trade-mark Reg. U. S. Pat. Off.

GENERAL  **ELECTRIC**

Coal Co.; and Robert L. Stearns Jr., Stearns, Ky., vice president, Stearns Coal and Lumber Co.

BCR officers were re-elected by the board as follows: Howard N. Eavenson, president; R. H. Sherwood, J. B. Morrow and Dr. Harold J. Rose, vice presidents; C. A. Reed, Washington, D. C., secretary; M. L. Garvey, Washington, treasurer; and J. F. Hanley, Washington, assistant secretary and treasurer.

Dr. Rose, vice president and director of research, described the scientific achievements and activities of the organization that is now investing \$375,000 annually in development work to make bituminous coal a better source of heat and energy. Dr. Rose stated that three laboratories, including Battelle Memorial Institute of Columbus, Ohio, are conducting research under BCR's general program. "Contracts have been signed with a fourth," Dr. Rose added. "Altogether, a total of 40 projects are under way."

Other speakers were Julian E. Tobey, chairman of the BCR technical advisory committee, and H. A. Glover, chairman of the agency's sales advisory committee. The former outlined the "must" items that require immediate attention from the scientists retained by the coal industry, including improved equipment for home consumption of solid fuel and more compact stoker-fired boilers for industrial use. Mr. Glover pointed out that research is needed to improve coal-burning equipment and provide the tools with which a recently announced national coal-heating service can build ready acceptance of solid fuel by the heat-buying public.

J. I. Yellott, director of research of BCR's Locomotive Development Committee, described the research activities of this group in developing a coal-fired gas turbine to provide a new form of motive power for railroad locomotives. He was followed by Dr. H. H. Lowry, director of the coal research laboratory, Carnegie Institute of Technology, who outlined the chemical studies under way which ultimately will create new, useful products from coal as well as improve combustion and gasification processes.

Technicians from the fuels division of Battelle Memorial Institute, Columbus, Ohio, headed by Ralph A. Sherman, supervisor, then summarized the 32 BCR projects authorized at that institution.

"In 1942," Mr. Sherman said, "BCR had a total budget of about \$60,000; in 1946, it is almost \$400,000. In 1942, Battelle was carrying on eight different projects for BCR; in 1946, a total of 32 has been authorized, although some are only now getting under way."

Other Battelle research engineers introduced by Supervisor Sherman included A. C. Richardson, supervisor of the laboratory's coal preparation division, who reported on what is being done in the investigation of cleaning, dewatering and drying coal to make it more suitable for utilization as industrial fuel, especially in plants taking advantage of the extremely fine sizes.

Hand-fired smokeless heating equipment was described in a paper by B. A. Landry, assistant supervisor of Battelle's fuels division. His report said that laboratory trials of the BCR smokeless stove, reported ready for commercial development, indicate that

Hercules Powder Company Announces

Improved Water Resistance for the Hercomites

 This important improvement in the Hercomites, and almost all of the Hercules ammonia dynamites, indicates greater effectiveness and economy for a wider range of blasting jobs than ever before. *Investigate this development today.*



Tamptite Cartridges save man-hours

The new Hercomites* are available in Hercules Tamptite Cartridges. These Cartridges expand when tamped, let the dynamite fill the bore hole snugly, leaving virtually no air space. No slit cartridges . . . spilled powder . . . but a concentrated charge, where it's most effective!

*REG. U. S. PAT. OFF. BY HERCULES POWDER CO.

HERCULES

XR-62

EXPLOSIVES DEPARTMENT HERCULES POWDER COMPANY 936 KING ST., WILMINGTON 99, DEL.

The odds are against him



...when wood is treated with

"CZC"

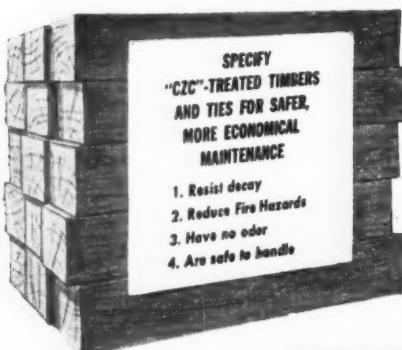
The spread of fire in mines is retarded when "CZC"-treated wood is used for timber and ties. But resistance to fire is only one of the advantages that "CZC"-treated wood offers.

Ties that have been treated with Du Pont Chromated Zinc Chloride will last many times longer than untreated ties. "CZC" safeguards them against fungous growths that cause destructive, weakening decay. It makes them more durable—better able to withstand continued usage.

You'll find that safety is increased and maintenance costs are lowered when "CZC"-treated wood

is used. Accidents caused by weakened ties and timber or fire are reduced; many costly delays caused by replacements are eliminated.

For additional information about "CZC"—the wood preservative that gives wood longer life—write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Del.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

DU PONT CZC

Chromated Zinc Chloride

WOOD PRESERVATIVE



the unit will perform satisfactorily with a wide range of coals, including those of the strongly coking variety.

Attention was called to the tremendous pent-up demand which exists today for automatic residential heating equipment by Harlan W. Nelson, Battelle research engineer, who told of BCR's three-point stoker program. The agency is seeking, he said, to: (1) develop a "fully automatic ash-removal stoker"; (2) "engage upon a program of testing and rating various types of coal in as many ash-removal stokers as become available"; and (3) "investigate various adaptations for the improvement of the conventional clinkering stoker," the type in common use today, "particularly with regard to its ability to handle a wider range of coals."

W. H. Browne, another Battelle research engineer, gave a detailed report of the investigation, which is still under way, of residential group heating.

Richard B. Engdahl, research engineer for Battelle, told of laboratory studies being made to improve chimneys. He also cited the success of overfire air jets, developed for BCR, in improving combustion and smoke abatement. He pointed out that jets are eliminating smoke from at least a thousand coal-burning locomotives, and that the "application of the BCR research information to date has demonstrated its worth" in controlling smoke from stationary plants. "Industrial coal-burning equipment need not be smoky," he said, "if reasonably operated and supplied with jets which are operated when necessary."

In a paper on "Improving the Iron Horse," E. D. Benton, of the Battelle staff, said: "Our research program is aimed at increasing the coal-fired locomotive's availability and efficiency. . . . The coal-fired steam engine is still a long way from being a back number, but all phases of its performance must be actively and aggressively investigated by research."

The last Battelle speaker, W. J. King, supplemented Mr. Yellott's earlier report by giving some of the laboratory background helping to "advance the day when a coal-burning, gas-turbine-driven locomotive that will outperform a diesel locomotive will be on the rails."

At least 60 persons attended the meeting of the BCR technical advisory board held in the auditorium of Battelle Memorial Institute, Columbus, June 29, with Julian E. Tobey, chairman, presiding. The board heard from committee chairmen, including:

Carroll F. Hardy, Cincinnati, chief engineer, Appalachian Coals, Inc., spoke for the committee on hand-fired heating equipment. He advised that the laboratory is making progress on a smokeless furnace involving the same principle as developed for the BCR smokeless stove.

Earl C. Payne, Pittsburgh, consulting engineer, Consolidation Coal Co., speaking for the regional-research committee, said that elimination of "spark plug trouble" is the chief need of his committee. Regional committees are active in Indiana and Illinois, it was reported, and organization of others is under way.

Chairman Tobey and J. I. Yellott gave reports for the motive-power committee of the TAB, the former dealing with the projects under way at Battelle for that committee,

For example

BARE ALCOA ALL-ALUMINUM CABLE,
EQUIVALENT TO 500,000 CM. COPPER,
WEIGHS ONLY 74.6 LBS. PER 100 FT.

Less weight . . .
TO SUPPORT IN
BORE HOLES WITH
ALCOA ALL-ALUMINUM
FEEDER CABLE

You'll simplify the installation of feeder cables by using lightweight Alcoa All-Aluminum . . . easier handling, much less weight to support.

Alcoa All-Aluminum Cables long ago proved their worth in coal mines where acid corrosion exists. Installations made thirty-five years ago are still going strong.

AVAILABLE FOR PROMPT SHIPMENT
No need to delay the extension of your feeder

lines. You can get shipment of Alcoa All-Aluminum Bare Cable in circular mil sizes to meet your needs.*

Complete data on these cables are available through the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 1763 Gulf Building, Pittsburgh 19, Pennsylvania.

* Alcoa does not manufacture insulated cable, but can have the insulation applied for you if that is required, and if you can allow the extra time.

ALCOA FIRST IN **ALUMINUM**

IN EVERY COMMERCIAL FORM



BIG IN NAME IN QUALITY IN PERFORMANCE



COAL SHOVELS



SMART BUYERS
SPECIFY BIG FIST SHOVELS
TO GET THESE EXTRA VALUE
FEATURES.

- Moly D Handle with Steel Banded Grip. Grip never loosens, checks or splits.
- Thoroughly seasoned XX Grade handles. Thoroughly sanded and waxed.
- Steel I-Beam Handle Reinforcement. Strengthens where most breaks occur.



MINERS PREFER
BIG FIST SHOVELS
BECAUSE

- Flat edge and wide curved flare of blade gets into and under coal.
- Fine Tool Balance lessens fatigue because shovel is easier to work with.
- Over-sized Moly D Handle is comfortable to any hand regardless of size.

THE WOOD SHOVEL AND TOOL CO., Piqua, Ohio

A National Organization Specializing Exclusively in
SHOVELS SPADES SCOOPS

and the latter concerning work of the BCR locomotive development committee.

Fred K. Prosser of Roanoke, Va., coal traffic manager, Norfolk & Western R. R., reported for the residential-stoker committee. He called on Battelle research engineers to describe the new "stoker wing" of the fuels division, use of which will speed up testing of conventional stokers and development of ash-removal types.

A report from Henry F. Hebley, director of research, Pittsburgh Coal Co., read by Dr. Rose, concerned activities of the mining and preparation committee. Eugene J. Kerr of Baltimore, Md., manager of technical services, coal traffic department, Baltimore and Ohio R. R., reported for the gasification and carbonization committee. It was stated that there is keen interest in "gas from coal" at this time.

Industrial utilization research was described by Vernon G. Leach, Chicago, fuel engineer, Peabody Coal Co. He stated that completion of development work on the BCR flowmeter, which measures the amounts of coal and air in a pulverized-coal system, had released engineers for important research on a compact stoker-boiler unit for commercial and small industrial use. R. L. Sutherland of Chicago, combustion engineer, Trux-Traer Coal Co., reported for his committee on agricultural uses.

Stockett Retires

The retirement of B. Helme Stockett, widely known in the anthracite industry, as general manager of the Locust Coal Co., Shenandoah, a subsidiary of Weston Dodson & Co. Inc., as a result of ill health that has kept him confined to his home in Pottsville since May, was announced July 11.

Joseph J. Crane, who has been assistant general manager of Locust Coal, will succeed Mr. Stockett as general manager, effective August 1.

Mr. Stockett has been associated with Weston Dodson & Co. Inc. for more than 33 years, joining the company as superintendent and engineer for the old Locust Mountain Coal Co., Shenandoah, in 1913. Previously he had been employed as mining engineer by the Lehigh Coal & Navigation Co., Lansford.

He had charge of the development and operation of the Locust Mountain property from 1913 until its exhaustion in 1933, in which period the property produced 9,500,000 net tons of commercial coal. It had, before it was closed out, the largest stripping operation in the region.

Mr. Stockett is considered an authority on stripping and was a pioneer in the development and use of electric draglines for stripping work. He also pioneered in the development of the Chance cone.

In 1918 Mr. Stockett became general superintendent of all the anthracite operations of Weston Dodson & Co., Inc., and shortly afterwards was appointed general manager of the company's bituminous properties as well. He continues as a member of the board of directors of the Locust Coal Co.

Mr. Crane, who succeeds Mr. Stockett, has been associated with Weston Dodson & Co., Inc., since 1914, joining the Locust

Trouble-Proof

AGAINST CORROSION, CLOGGING
AND PRODUCT CONTAMINATION

GRINNELL-SAUNDERS DIAPHRAGM VALVES

Screwed or Flanged Patterns

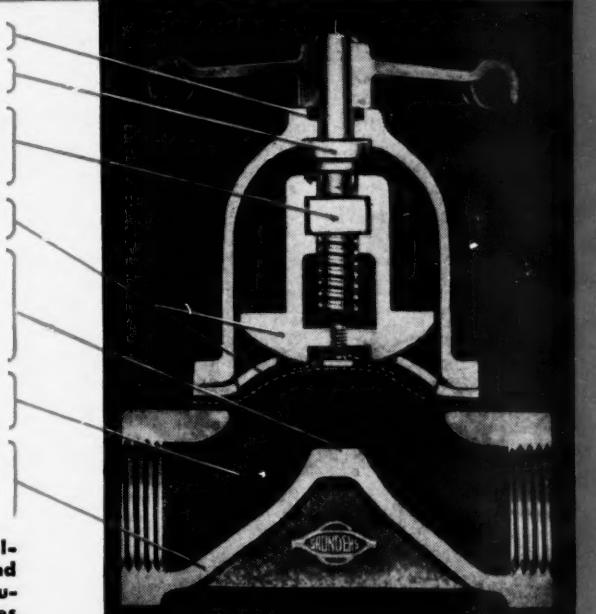
Users of compressed air, gases, viscous or corrosive liquids, food products and fluids containing suspended solids — this is the valve that may eliminate your troubles!

- ★ No packing glands to demand constant attention.
- ★ Non-rising stem eliminates breakage. Stem is protected from dust, weather and corrosion.
- ★ Working parts completely isolated from the fluid. No sticking, corroding or clogging to interfere with easy operation and tight closure. No contamination from valve lubricants.
- ★ Compressor and finger plate combine to support the diaphragm in all positions.
- ★ The large area of contact of the diaphragm on the seat, plus the resilience of the diaphragm, permits positive closure even when foreign matter is trapped.
- ★ No metal-to-metal seats to become damaged, wire drawn or scored. No refacing, reseating or grinding is required.
- ★ Streamlined passage without pockets reduces friction to a minimum and prevents accumulation of sludge and foreign solids.
- ★ The valve body — the only metal that could contact the fluid — can be completely lined with glass, porcelain, lead, rubber or synthetic compounds (flange type only) to suit service requirements.

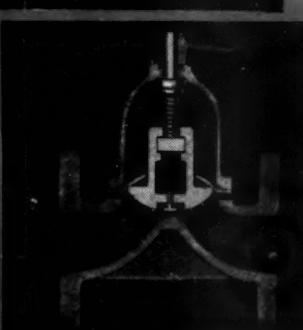
Write for catalog describing Grinnell-Saunders Diaphragm Valves — standard and special types. Grinnell Company, Inc., Executive Offices, Providence 1, R. I. Branch offices in principal cities.

AVAILABLE IN SPECIAL TYPES

The "quick operating" lever design is one of several types.



VALVE OPEN



VALVE CLOSED

GRINNELL

WHENEVER PIPING IS INVOLVED

Added Protection for Tires



To the economy-wise cable buyer, the new Selenium Neoprene Armor on all TIREX electrical Cords and Cables means greater savings resulting from longer service life and more dependable performance than ever before.

This new TIREX jacket provides unexcelled protection from sunlight and heat, thus preventing cracks or light-checks, and its resistance to oils, greases, acids, and moisture eliminates costly deterioration. Selenium Neoprene Armor also features increased safety value as it is flame-resistant, and is unsurpassed in its capacity to withstand the wear and tear of harmful abrasives.

For a better buy, specify Simplex-TIREX, the only cords and cables featuring the long-lived protection of Selenium Neoprene Armor.

Simplex-WIRES & CABLES

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39, MASS.

Mountain Coal Co. as a stenographer. In 1925, Mr. Crane became mines accountant for all Dodson anthracite operations and in April, 1938, he was promoted to the position of assistant to General Manager Stockett. He became assistant general manager in July of the same year.

Former Union Leader Held in Mine Shooting

John Powell, former U.M.W.A. local president, was held by Bell County, Kentucky, authorities last month following the fatal shooting June 29 of Robert Z. Halbert, superintendent for the Bell Coal Co., Rella, Ky. According to reports, Powell entered Halbert's office with another miner, Tilman Bolinger, who was to be held on conspiracy charges, and demanded his "vacation pay." When Halbert explained that miners who had not worked through May 22 were not entitled to full vacation pay, Powell grew angry, witnesses said, and drew a pistol, firing three times.

Russian Mine Machinery Copies American Types

MOSCOW (McGraw-Hill World News) —Russia's new postwar mining equipment is now beginning to appear and a survey of Soviet mines shows that it is closely patterned after American machines. The use of American-built equipment in the restoration of the war-smashed Donbas coal basin apparently has had an effect on Russian designers.

The new Russian power winches, for example, are patterned after winches manufactured by Allis-Chalmers—the same type that was installed shortly after the rehabilitation of the Donbas began. The new cutting machines closely resemble American short-wall and Universal models, and motors and belt conveyors are patterned after "Joy-type" machinery.

It only has been since the end of the war that Russia has turned to mass production of mining equipment. Heretofore the Russians have been experimenting with various types of mechanized equipment but the resulting models never proved good enough to put into mass production throughout the U.S.S.R.

Under the new five-year-plan, greater emphasis is to be laid on the development of power machines in all underground operations. To date, only comparatively simple machinery—such as drag scrapers and narrow-gage wagons with occasional small bucket-type loaders—has been employed in Russian mines.

At the present time, 82 percent of all underground operations in Russian mines are carried out by hand. Only 18 percent of the work is accomplished with power-driven tools. The low percentage of machine work is attributable to the fact that coal-mining technology has undergone little change in Russia in the last ten years.

Unless Britain's mines can make up a 5,000,000-ton coal deficit before winter with their present labor force, industries will have

thermoid

-Key to Progress in Many American Industries



The old method of getting bricks to the bricklayers has been superseded by the modern Thermoid Conveyor Belt.



Here's the modern method. This Thermoid Belt was chosen because neither weather nor the sharp bricks will injure the belt.

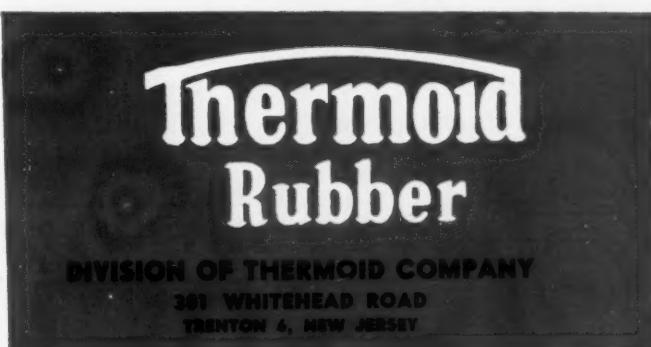
SINCE 1880, Thermoid has contributed to the progress of American Industry. In many fields of business Thermoid Products play an indispensable part. For instance, the George Haiss Manufacturing Company, manufacturers of portable conveying equipment, chose Thermoid Conveyor Belting for the portable brick conveyor shown above.

The Thermoid Line* is the result of 65 years of research and experience that not only has kept pace with the demands of industry, but in many cases anticipated industry's needs.

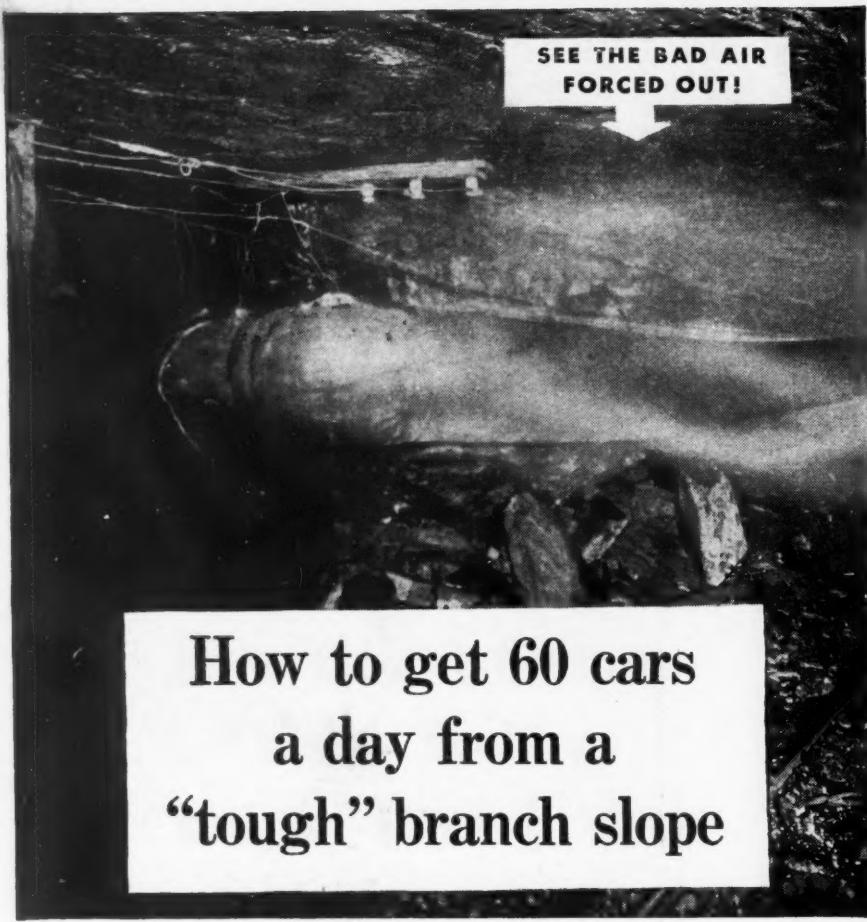
The Thermoid Line* of belting and hose for materials handling and power transmission may contain the key to another step forward in the improvement of your process and the reduction of your costs.—"It's Good Business to Do Business With Thermoid."

***THE THERMOID LINE INCLUDES:** Transmission Belting

- F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose
- Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.



Contributor to Industrial Advancement Since 1880



How to get 60 cars a day from a "tough" branch slope

Circulating the main air course down the steep slope of this branch was a tough problem. The air was so bad that they simply couldn't get any coal out . . . until a Du Pont representative came down and looked over the situation.

He remedied the trouble quickly with a "Ventube"** auxiliary ventilation system. The bad air was forced out in no time at all, with a brattice curtain to prevent recirculation. Soon the air in the branch slope was clear . . . and production went from zero up to 60 cars a day.

This is another example of how "Ventube" systems help to level off the peaks of mining costs, giv-

ing efficient operations to insure a safe margin of profit.

Whatever problems you face from day to day, depend on "Ventube" (attached to a permissible blower fan) to bring fresh, cool air to men at the face . . . to reduce downtime after blasting . . . to speed your production. Light weight and long-lasting. Easy to install, to move, to store. Low in both original and upkeep cost.

For details, consult Du Pont Technical Service, Fabrics Div., E. I. du Pont de Nemours & Co. (Inc.), Fairfield, Conn.

**"VENTUBE" is Du Pont's registered trade mark for its flexible, synthetic-rubberized ventilating duct.



DU PONT "VENTUBE"

REDUCING COSTS THROUGH BETTER VENTILATION

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

to shut down and homes go cold, Emanuel Shinwell, Minister of Fuel and Power, warned the House of Commons July 24. At the present production rate the country's coal stocks would total 11,000,000 tons on Nov. 1, Mr. Shinwell said. Britain is now consuming coal at the highest rate in history, while production is running 15 to 20 percent under the prewar level.

In introducing his survey of the manpower situation Mr. Shinwell said, "I am bound to say it is a very distressing story." Citing the too frequent lack of cooperation on the part of trade unions and operators, the long history of bad labor relations in the industry, and the dim prospect of any improvement in working conditions despite the determination of the new National Coal Board to make this the first order of business when it takes control of the industry, he pointed out that if output is to be improved in time to meet the winter crisis, it will have to be done by the present workers.

British Board Sets Mine Payment

Compensation for the transfer of British coal mines to public ownership has been fixed at £164,660,000, equal to \$663,579,800, it was announced Aug. 1. The figure was determined by a special coal-compensation tribunal set up under the nationalization act and covers the mines and machinery but excludes certain subsidiary assets such as coke ovens and byproduct plants. The award, which is to be made in government bonds, was described by Lord Greene, head of the board, as "fair compensation" to the owners.

Management Provides Miners' Vacations

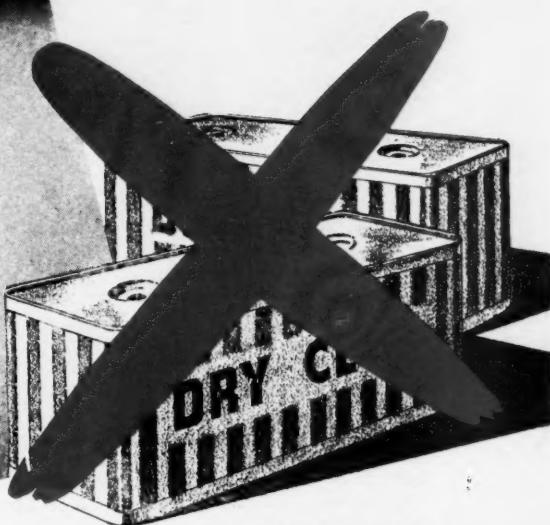
The 50 employees of the Wallick Coal Co., near Dundee, Ohio, were last month ready to begin two-week vacations in Canada as guests of the management. The unique vacation plan, which includes all employees on a rotation basis, is the idea of Mr. and Mrs. Clyde A. Wallick, owners and operators of the mine, who, on their vacation two years ago, spent considerable time finding a suitable location. The 170-acre tract finally selected is on the Trent river near Campbellford, Ont., and includes a main lodge and six cottages. Boats and other equipment are provided by the Wallicks.

Ohio Association Plants 1,340,600 Trees

Planting of 1,340,600 trees on 1,400 acres of reclaimed strip lands in Ohio this spring has been reported by the Ohio Reclamation Association, an organization formed to reclaim Ohio stripped areas. The group stated that it had planned to plant more than 2,500,000 trees but was unable to obtain sufficient nursery stock, finding it necessary to truck in from other states 369,000 seedlings to complete the planting.

An outspoken advocate of State strip-mining control was named to the Ohio strip-mining commission in the appointment July

NO DRY CELLS NEEDED!



WHERE THERE'S A **WHEAT** LAMP THERE'S SHOOTING POWER

The NEW WHEAT CAP LAMP SHOT-BLASTING COMBINATION enables a miner to detonate single shots safely, simply and quickly by using the current from his lamp battery. It eliminates all dry cell purchases. It also excludes subsequent expense resulting from time lost by leaving working face in search of dry cells.

Series of single blasting shots can be made daily without affecting the high light efficiency of the Wheat Lamp. Miner does not shoot in the dark—Wheat Lamp *always* remains burning.

The method is easy: With lamp burning, hold one wire-end on precious metal contact point at base of Wheat Headpiece. Insert other wire-end in center hole of Cap Lamp

Switch to complete the detonating circuit. Contact in switch is also made of precious metal; it will not corrode. Assures perfect contact at all times.

The NEW WHEAT SINGLE SHOT BLASTING UNIT is designed to be adapted in the Lamp House at small expense to all the latest model Wheat Lamps. This NEW UNIT has passed exhaustive safety tests. *It is approved by the United States Bureau of Mines.*

With this NEW WHEAT CAP LAMP-SHOT BLASTING COMBINATION you get the same WHEAT Safety *plus added Productivity with greater Economy.*

Wheat Lamp representatives will gladly demonstrate this advanced method of shot-firing. *Equip your lamps today!*

KOEHLER—THE OLDEST COMPANY MANUFACTURING APPROVED MINERS' LAMPS

Write today—
**WHEAT LAMP
SALES CO.**

1501 Kanawha Valley Bldg.
Charleston, W. Va.

MANUFACTURED BY
KOEHLER MFG. CO.
MARLBORO, MASS.
SPECIALISTS IN MINE LIGHTING
FOR MORE THAN 30 YEARS



OTHER SALES
REPRESENTATIVES
E. D. BULLARD CO.
San Francisco
B. C. EQUIPMENT CO., LTD.
Vancouver, B. C.
H. C. BURTON & CO.
Hamilton, Ontario
OLDHAM & SON, LTD.
Manchester, England

In the Market for a COAL WASHING TABLE? *SuperDuty* is your logical choice because—



- This table will produce a washed coal product of ash content normally within $\frac{1}{2}$ of 1% of the theoretically perfect separation. At the same time the refuse produced will be so devoid of combustible as to preclude any further means of economic retreatment.
- Greater efficiency results from SuperDuty's exclusive diagonal deck, which places approximately 75% more working riffles in the natural path of separative action.
- The SuperDuty Table is economical in original purchase price, installation and maintenance. This is largely due to the fact that SuperDuty is the top quality table—complete and ready-to-install, with under construction built in at the Concenco factory and pre-aligned for you.
- The self-oiling head motion delivers a smooth, powerful "kick", and stroke is adjustable while the table is in motion. SuperDuty operates at substantially 1 H.P. under full load.

In addition to these, there are many other reasons for the superior performance and economy of SuperDuty Coal Washing Tables. Write today for full details.



Concenco Feed Distributors

The Concenco Revolving Feed Distributor is a heavily fabricated, all steel machine, built in various types, with motor drive requiring less than $\frac{3}{4}$ H.P. in operation. This distributor effects perfectly a splitting of feed sliced to its revolving cone, into any desired number of equal portions. It is especially suitable for efficiently feeding a battery of coal washing tables, giving an equal distribution of feed to each table.

THE DEISTER ★ CONCENTRATOR COMPANY

909 Glasgow Ave. • Fort Wayne, Ind., U.S.A.



★ The ORIGINAL Deister Company ★ Inc. 1906

15 by Governor Lausche of Edwin J. Bath, legislative agent of the Ohio Farm Bureau Federation, to succeed Richard A. Lindemann, who was recently named to the State board of liquor control. Mr. Bath has previously appeared before the commission, which is drafting legislation to be placed before the legislature, expressing the farm bureau's advocacy of state control.

Awards Announced For Industrial Designs

A \$200,000 "Design-for-Progress" award program, intended to encourage study and preparation of papers on design, research, education, application and use of arc welding in industry, has been announced by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. The program offers prizes in each of 15 major industry classifications and in 43 divisions which comprise these classifications. The main program award is \$10,000, with a \$2,500 first award in each classification and \$700 first award in each division. There are 452 awards in all.

Those engaged in the design, manufacture or construction of coal-mining machinery may enter their papers under the Processing or Plastics Machinery division and are eligible for awards in the Industry Machinery classification. Complete details may be secured by addressing the secretary of the foundation.

Spindler Urges Safety Before W. Va. Group

The Central West Virginia Coal Mining Institute, attended by approximately 150 State and federal inspectors and other mining men, at its largest meeting of the season, July 12, Webster Springs, W. Va., heard the speaker of the evening, G. R. Spindler, chief of the West Virginia State Department of Mines, set forth the policy and function of the State Department of Mines.

The primary function of this department, Mr. Spindler said, is safety. He also pointed out that in 1945 West Virginia saw its best accident record in history, with the least number of fatalities per million tons of coal mined. The state's record as a whole for last year was approximately 550,000 tons produced per fatal accident.

By and large, 60 percent of those accidents were caused by roof and rib falls. Safety has come a long way, but the employer, employees and State Department of Mines working together must not be satisfied until a greater degree of perfection along safety lines has been effected.

Last year 46 million tons of coal was produced in Central West Virginia, which is approximately one-third of the state's total production, yet only about one-fifth of the state's mining accidents occurred in this same region, he pointed out.

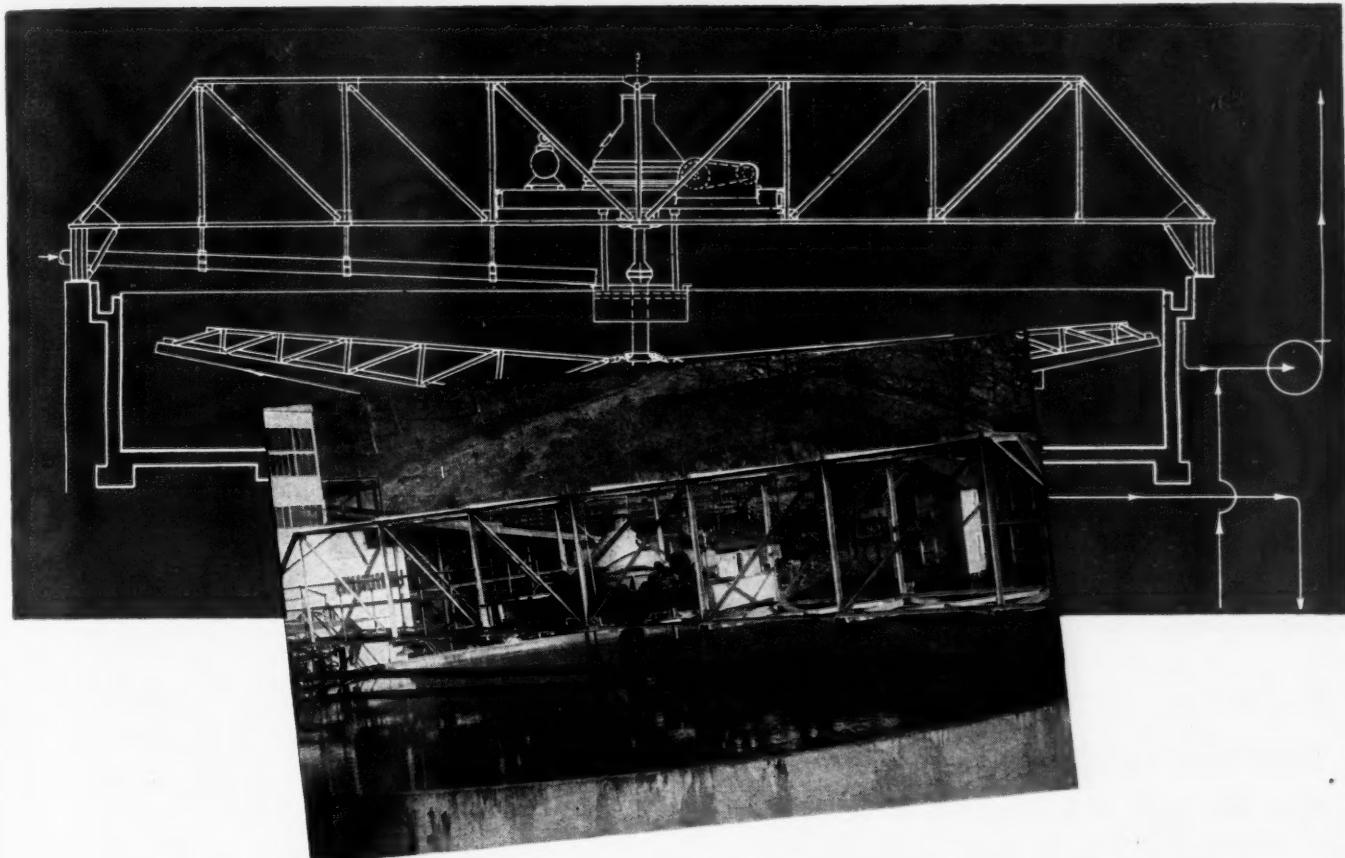
In citing contributing factors that cause accidents, Mr. Spindler showed how dangerous conditions and dangerous practices together cause accident frequency to shoot sharply upward. He urged more timbering of unexposed and recently exposed roofs, the characteristics of which are unknown

ANOTHER LARGE COAL MINING COMPANY

has just ordered

2

GENERAL AMERICAN THICKENERS



This decision was made — after a careful study of the performance of the thickener installation shown above — because the General American Thickener is the most completely automatic and foolproof thickener now available.

The hydraulic lift makes a virtually "choke proof" machine, permitting shut-downs without recirculation, and starting under

a full load. The thickener will never stall in the event of a power failure. Where operation is such that surges of fine coal occur, the thickener will handle them automatically.

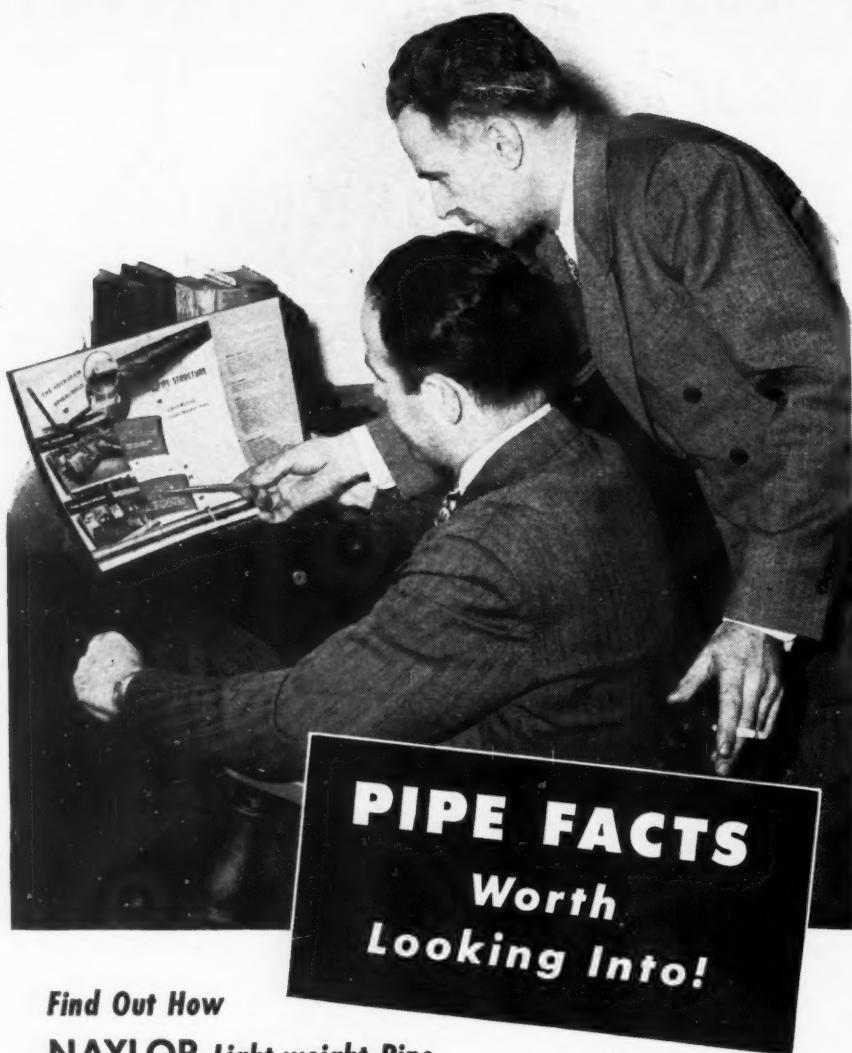
A General American engineer will be glad to assist you in designing new units or modernizing your existing coal dewatering plant.

General American
TRANSPORTATION CORPORATION
process equipment • steel and alloy plate fabrication

SALES OFFICE:
515a Graybar Bldg., New York 17, N. Y.
WORKS: Sharon, Pa.; East Chicago, Ind.



OFFICES: Chicago, Louisville, Cleveland,
Sharon, Orlando, St. Louis, Salt Lake City,
Pittsburgh, Washington, D. C.



Find Out How

NAYLOR Light-weight Pipe

Does the Work of Heavy Pipe at Lower Cost

Why use heavy-wall pipe when there is a light-weight pipe built to handle the job?

Though light in weight, Naylor Pipe has the exclusive Lockseam Spiralweld structure that provides the greater strength, leaktightness and safety needed to handle jobs normally requiring heavy-wall pipe.

Advantages include twice the footage from the same tonnage of steel. Savings in laying costs up to 50 per cent. Reduced trucking expense. High salvage value.

The new Naylor Catalog tells the complete story of Naylor performance and economy with a special section devoted to the mining field. Write for your registered copy today.

**NAYLOR LOCKSEAM
SPIRALWELD PIPE**

NAYLOR PIPE COMPANY

1268 EAST 92nd STREET, CHICAGO 19, ILL.

New York Office:

350 Madison Ave., New York 17, N. Y.

because of lack of time to study them.

Mr. Spindler asserted that production and safety directors should work together for a decrease in mining accidents, and there should be no conflict between those men who are charged with greater tonnage and those charged with lowering the accident rate. To make the mining industry economical and sound, production men and safety men must work toward a common goal.

Mr. Spindler, who made an extensive study of English mining methods during the war for the government, averred that nationalization of the mines in that country had resulted partially from the lax safety program, which had left its scars upon the industry. He declared that the State Department of Mines and operators should heed this warning and maintain good safety conditions to avoid the experience of England.

Following the presentation of the paper, comments were made by F. K. Day and C. W. Thompson, Webster Springs, both of the Pardee & Curtin Lumber Co.

Coal Supply Eases in Canada

Fear of a critical coal shortage in Canada next winter, which had government officials gravely concerned two months ago, appeared to be evaporating last month, as Canadian mines operated at high capacity and coal was received in large quantities from the United States.

Despite a not-too-bright coal-supply outlook this winter, nothing so drastic as coal rationing is contemplated, according to E. J. Brunning of Ottawa, coal controller. He warned, however, that Canadians should heed the advice to lay in coal supplies early. Some authorities expressed the fear that panic buying as a result of the publicity given the anticipated shortage might make it impossible to build up sufficient stocks, however.

In Toronto, however, Mayor Saunders said that there were indications the city would be 300,000 tons short of industrial coal this winter and that he was writing Premier D. C. Manning of Alberta to investigate "the possibilities of their shipping 300,000 tons of Alberta coal into Toronto this winter."

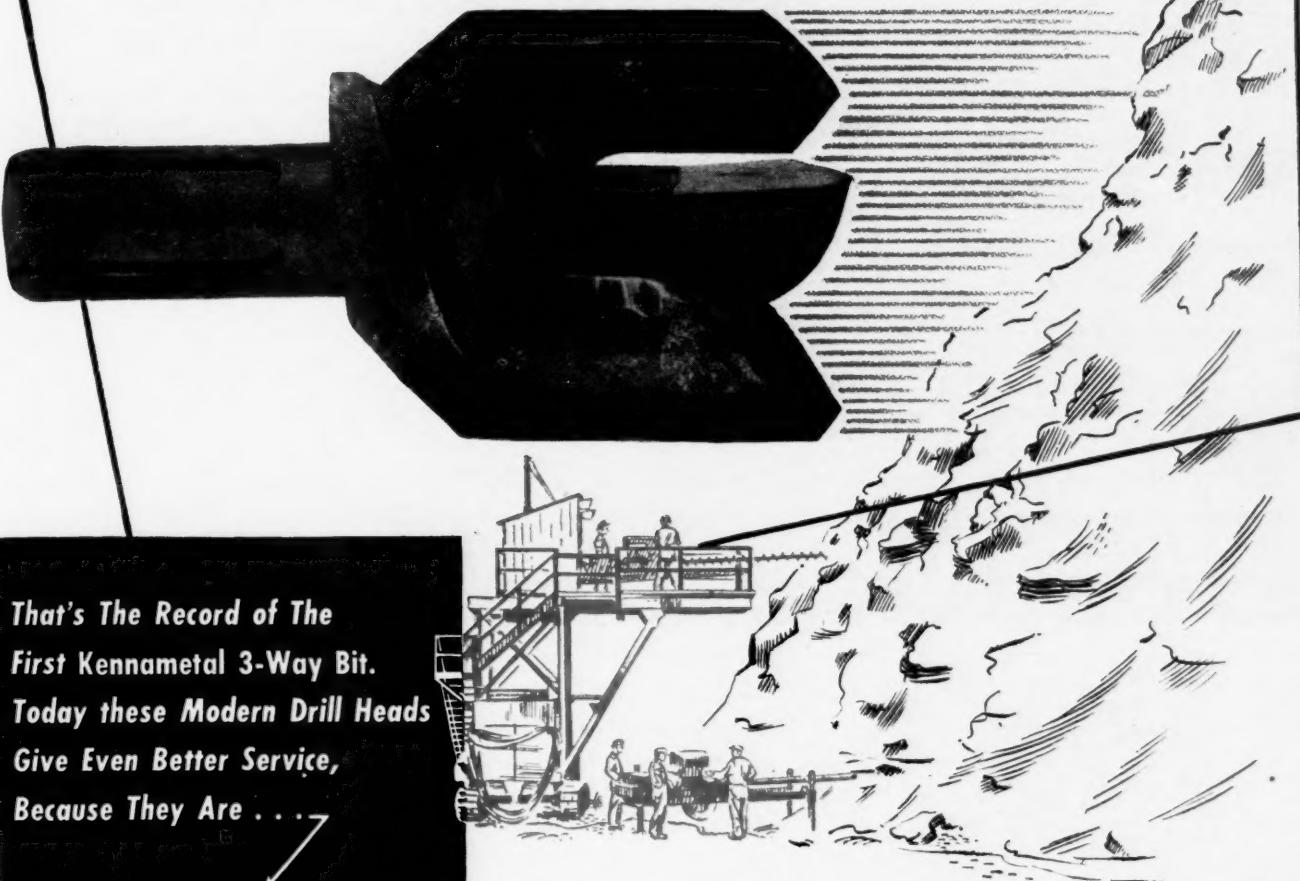
Positive contradiction of the government's optimism was put forth by E. R. Lockyer, secretary of the Toronto Coal Exchange, who wondered "where Ottawa has recently discovered the missing four or five million tons" cited a month before. "We are definitely behind, due to the Canadian shipping strike and American labor troubles," he said, "and what has been lost cannot be regained."

In surveying the situation, fuel dealers in Montreal were extremely doubtful that any British or Welsh coal would reach them this winter. Most of the coal bought from Canadian mines was for industrial use, they explained, and the United States, therefore, will have to fill the gap in the domestic supply.

Another step in the development of the Peace River district of Northern British Columbia was seen in the announcement July 20 by John Hart, premier of British Columbia, of the appointment of Gordon L. Kidd, of Drumheller, Alta., to make a sur-

1500 FEET DRILLED

*and its Cutting Edges
are still Keen!*



*That's The Record of The
First Kennametal 3-Way Bit.
Today these Modern Drill Heads
Give Even Better Service,
Because They Are . . .*

Now improved

by a properly shaped extension of the shank projecting between the prongs to form an effective core breaker; and by modification of the cutting edge angles, that has resulted in distinctively extended service life.

The Kennametal-tipped 3-Way Drill Bit shown above was the first of its type ever used by a surface mine. After drilling thirty 50-foot holes in typical overburden, its edges were still keen. Thus, the tool material that had previously revolutionized metal-cutting, demonstrated that it was ready to do an outstanding job for America's mining industry.

Today, Kennametal 3-Way Drill Bits are at work at scores of leading surface mines. Typical field experiences are as follows:

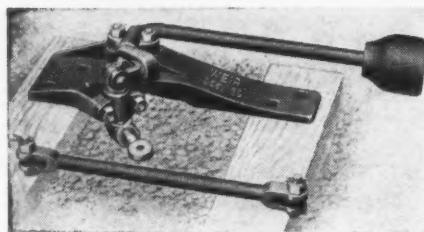
- Ohio mine reports: "Have used a Kennametal Bit continuously for one month and it is still cutting faster than any other type bit we ever used."
- Indiana mine says: "First Kennametal Bit used drilled holes needed in removing one-half million cubic yards of overburden, before being resharpened."
- Pennsylvania mine reports: "Kennametal Bit put down 15 holes, 60 feet deep, in 390 minutes, in overburden consisting of hard shale imbedded with limestone nodules. Did not need resharpening."

The Kennametal Drill Bit is a sturdy, one-piece heat-treated alloy steel casting, having cutting tips of Kennametal—the tool material that is much harder than the hardest tool steel (75 Rockwell C compared to 66). It is scientifically contoured to maintain gage throughout its long life. The shank is welded-in bar steel, adaptable to fit all common types of augers. *It is the first and only bit that drills holes without taper—and drills more of them faster, cheaper.* Ask us to show you the evidence.



**SWITCH STANDS that CONSISTENTLY Prove
Their Value in moving MORE COAL...FASTER**

**WEIR
KILBY**



Design 25—Parallel Throw

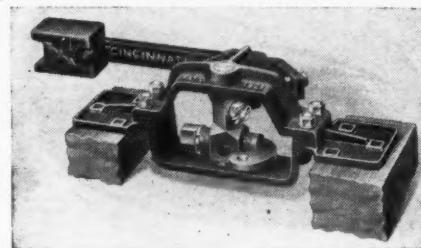


Open Type Spring Rod



Enclosed Type Spring Rod

These switch stands furnished with either solid or spring connecting rods.



CHAMPION Parallel Throw

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION

CINCINNATI 12, O.

BIRMINGHAM 7, ALA.



**THE MERRICK
FEEDOWEIGHT**
Reg. U. S. Pat. Off

**tells rate per hour
—weight per day**

A self-contained automatic conveyor scale, combined with automatic gate to give feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Feed rate may be varied. Large feed opening insures even flow. Uniformly feeds bulk material BY WEIGHT; and automatically totalizes weight of materials fed. Durable. Simple to operate. Rugged, heavy duty design. Slow moving parts mean long life. Easy to install and maintain.

we also manufacture

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.

Engineers & Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J., U. S. A.

vey of the coal resources in the district under the direction of Dr. T. B. Williams, commissioner of petroleum and natural gas. Full information on the coal and oil possibilities of the district is being sought before a decision is made on the extension of the government-owned Pacific Great Eastern R.R. into the area.

Mine Fatality Rate Lowered in May

Accidents at coal mines in the United States caused the deaths of 22 bituminous miners and 15 anthracite miners in May, 1946, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 22,420,000 net tons, the bituminous fatality rate was 1.08 per million tons, compared with 6.23 in April and a similar preliminary rate of 1.68 per million tons for May a year ago, which was later revised to 1.96.

The anthracite fatality rate from accidents in May, 1946, in mining 5,468,000 net tons, was 2.74 per million tons, a slight increase over the April rate of 2.57, and considerably over that of 0.94 per million tons for May, 1945, later revised to 0.97.

For the two industries combined, the May, 1946 fatality rate was 1.43, compared with 3.99 for the preceding month, and the preliminary rate of 1.65 for May, 1945, later revised to 1.92.

May 1946 fatalities, by causes and states, and comparable rates for the first five months of 1945 and 1946, were as follows:

U. S. COAL-MINE FATALITIES IN MAY, 1946, BY CAUSES AND STATES

State	Underground						Total Under- ground	Open- Cut	Grand Total
	Falls of Roof	Falls of Face	Haulage	Explosives	Other Causes				
Alabama.....	2	—	—	1	—		3	—	3
Colorado.....	—	1	1	—	—		2	—	2
Illinois.....	—	—	1	—	—		1	—	1
Indiana.....	1	—	—	—	—		1	—	1
Kentucky.....	1	—	2	—	—		4	—	4
New Mexico.....	1	—	—	—	1		1	—	1
Ohio.....	1	—	—	—	—		1	—	1
Penna. (bituminous).....	1	—	—	—	—		1	—	1
Tennessee.....	1	—	—	—	—		1	—	1
Virginia.....	3	—	—	—	—		3	—	3
West Virginia.....	2	1	—	—	—		3	1	4
Total bituminous.....	13	2	4	1	1		21	1	22
Penna. (anthracite).....	9	—	—	3	3		15	—	15
Grand total.....	22	2	4	4	4		36	1	37

DEATHS AND FATALITY RATES AT U. S. COAL MINES BY CAUSES OF ACCIDENTS* JANUARY-MAY 1946 AND 1945

Cause	Bituminous				Anthracite				Total			
	1946	1945	1946	1945	1946	1945	1946	1945	1946	1945	1946	1945
Underground:												
Falls of roof and face....	144	181	0.780	0.735	52	20	2.014	0.950	196	201	0.931	0.752
Haulage.....	52	95	.282	.386	13	10	.503	.475	65	105	.309	.393
Gas or dust explosions:	—	—	—	—	—	—	—	—	—	—	—	—
Local.....	9	—	.037	—	—	1	—	.048	—	10	—	.037
Major.....	27	39	.146	.158	—	—	—	—	27	39	.128	.146
Explosives.....	4	8	.022	.032	4	3	.155	.143	8	11	.038	.041
Electricity.....	3	6	.016	.024	2	—	.077	—	5	6	.024	.023
Machinery.....	6	21	.033	.086	1	2	.039	.095	7	23	.034	.086
Shaft.....	2	3	.011	.012	1	1	.039	.048	3	4	.014	.015
Miscellaneous.....	8	5	.043	.021	8	7	.310	.332	16	12	.076	.045
Total underground.....	246	367	1.333	1.491	81	44	3.137	2.091	327	411	1.554	1.538
Stripping or open-cut.....	6	10	.033	.041	5	2	.193	.095	11	12	.052	.045
Surface.....	18	24	.097	.097	4	5	.155	.238	22	29	.105	.108
Grand total.....	270	401	1.463	1.629	90	51	3.485	2.424	360	452	1.711	1.691

* All figures are subject to revision.

It lends a helping hand to RIGGING UP



...Save installation time
with limber, kink-resistant
PREFORMED YELLOW STRAND

You've finished checking block, sheaves and drum. Now you're about to put on a new *Preformed Yellow Strand* line. Watch how its flexibility simplifies each stage of installation.

Note the willing way it comes off the reel or coil. Here's where unpreformed rope too often meets with injury. But there's no twisting, no kinking, with *Preformed Yellow Strand*—and that goes also for Lang lay and Independent Wire Rope Center constructions. Pent-up stresses have been *relaxed* by preshaping wires and strands during manufacture.

Since the ends do not flare

out, limber *Preformed Yellow Strand* can be threaded quickly through blocks and sheaves... attached easily to the drum ... socketed or fastened without distorting the parts. Smooth, even first-time spooling further shortens change-over delay.

Crowning all these time-saving advantages is the *longer life* of *preformed* rope which postpones replacements, keeps

men and machines on productive jobs.

Specify *Preformed Yellow Strand* by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. Branches: New York, Chicago, Houston, Portland, Seattle. Factories: St. Louis, Seattle, Peoria.

HAND BOOK FREE: "Wire Rope for Mining" contains useful facts, tables, pictures. Write for your copy.

BRODERICK & BASCOM
Yellow Strand
PREFORMED WIRE ROPE



FASTER WELDS...
EASIER APPLICATION...
Same high WEAR RESISTANCE
With the New
**Coated STOODY
SELF-HARDENING**

USERS of hardfacing alloys have long been acquainted with Stoody Self-Hardening, the low-cost rod that provides 2 to 1 wear resistance over manganese steel. Now a new, improved extruded flux coating brings even better welding characteristics to this old favorite!

EASY APPLICATION with both AC and DC welding machines in a wide range of amperages.

STEADY ARC with fast deposition rate. No slag interference.

CAN BE HANDLED IN ALL POSITIONS
WELDS IN ANY BEAD TYPE

SOLID, DENSE DEPOSITS with an absolute minimum porosity.

SELF-LIFTING SLAG for easy clean-ups.
STRONG BONDS with all steels including manganese.

Use the new **COATED STOODY SELF-HARDENING** for maximum protection against earth abrasion and impact on all heavy equipment. Available in $\frac{1}{4}$ ", $\frac{3}{8}$ " and $\frac{1}{2}$ " rod diameters.

ORDER NOW! 50 lbs. of the NEW COATED STOODY SELF-HARDENING will convince you it's easier to use, faster to apply and still tops for wear protection! Costs only 50c per pound f. o. b. distributors' warehouse or Whittier, Calif.

Buy some Today!

STOODY COMPANY
1143 W. SLAUSON AVE., WHITTIER, CALIF.

STOODY HARD-FACING ALLOYS
Retard Wear Save Repair



The American Legion Drum and Bugle Corps, dressed in miners' outfits complete to hat lamps, headed the parade marking the world premiere of the new film on coal, "Magic Minerals", in Bluefield, W. Va., last month. Senator Harry M. Kilgore of West Virginia was the principal speaker at the opening, which was attended by many other state notables.

Utilization Conference Resumed at Illinois

The eighth University of Illinois Conference on Coal Utilization will be held Sept. 17-19 on the University of Illinois campus. Prof. Harold L. Walker, head of the department of mining and metallurgy and chairman of the conference, has announced. Ordinarily held every two years, the conference this fall will be the first since 1941, when sessions were discontinued because of travel restrictions. Attendance in the past has ranged from 200 to 325 and has included representatives from 18 states.

The 1946 program will include sessions on development of coal utilization, storage and handling, coal merchandising, improving heating results, heating new homes and stoker coal.

Nova Scotia Society Views Coal's Future

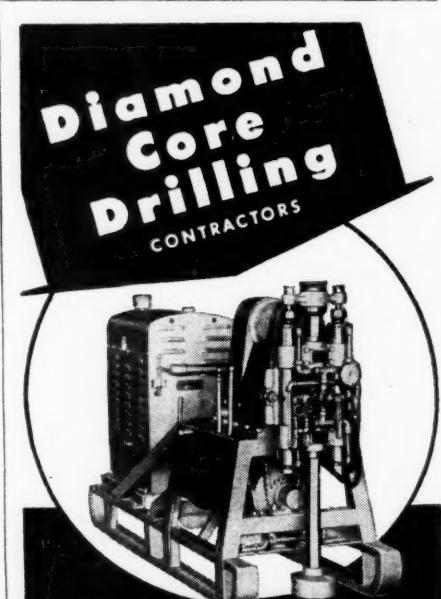
HALIFAX (McGraw-Hill World News) — The coal-mining industry in Eastern Canada will do postwar business on a highly competitive basis to meet not only imports from the United States but the increasing use of fuel oil, it was brought out at the annual meeting of the Mining Society of Nova Scotia recently held in Kentville. Operators were warned that ways of using coal more efficiently must be found if, in the face of such competition, they are to hold present markets and regain those lost during the war.

Among the suggested steps to meet competition were: (1) automatically operated hot-water central stations to supply heating for blocks of 40 to 80 private homes; (2) installation and servicing of automatic coal stokers with mechanical ash extractors and ash conveyors, following the plan already introduced in Pennsylvania; and (3) a domestic pulverized-fuel automatic burner equipped with automatic relighting of the

pulverized coal stream.

Studies of all these methods have been made by the national research committee of the Canadian Institute of Mining and will be continued for another year at the Sydney mines under guidance of W. T. Brown, Pittsburgh consultant, it was announced.

Other topics discussed at the meeting in-



Testing mineral properties with our light gasoline drills. **SATISFACTORY COAL CORES GUARANTEED.** Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA



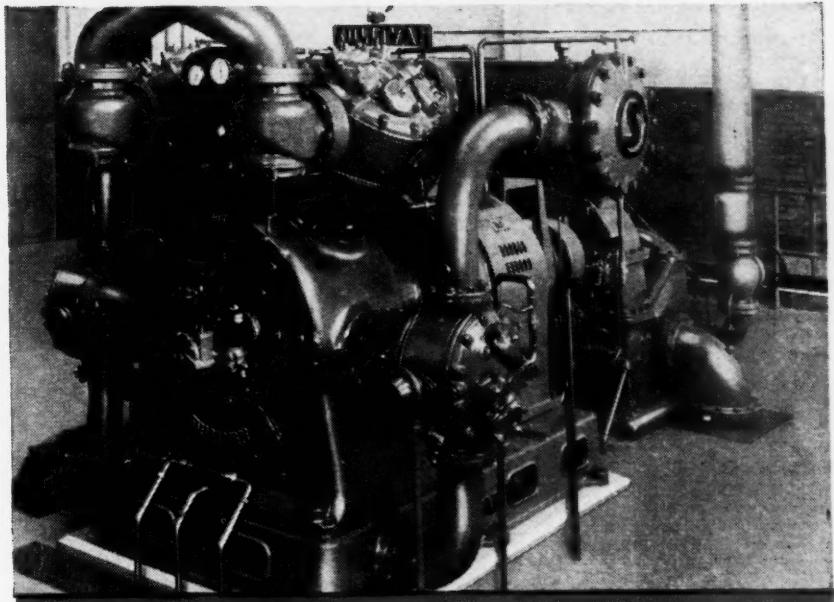
SULLIVAN AIR COMPRESSORS

CUT
AIR-POWER
COSTS
IN COAL
MINING!

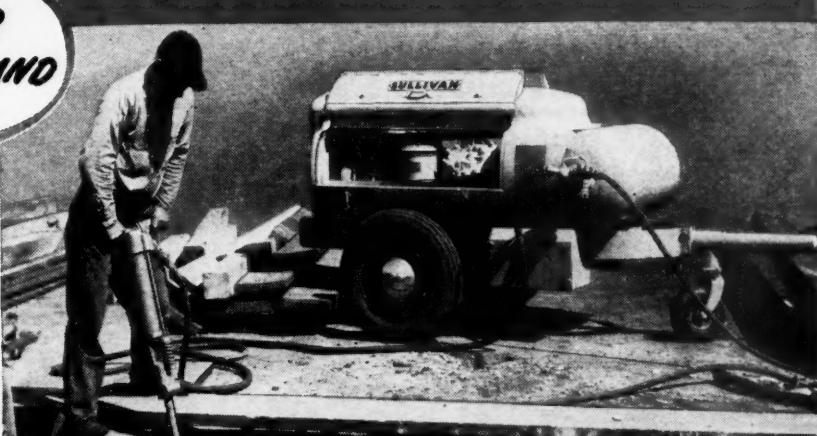
Consult
a
Joy
Engineer



W & D CL 592

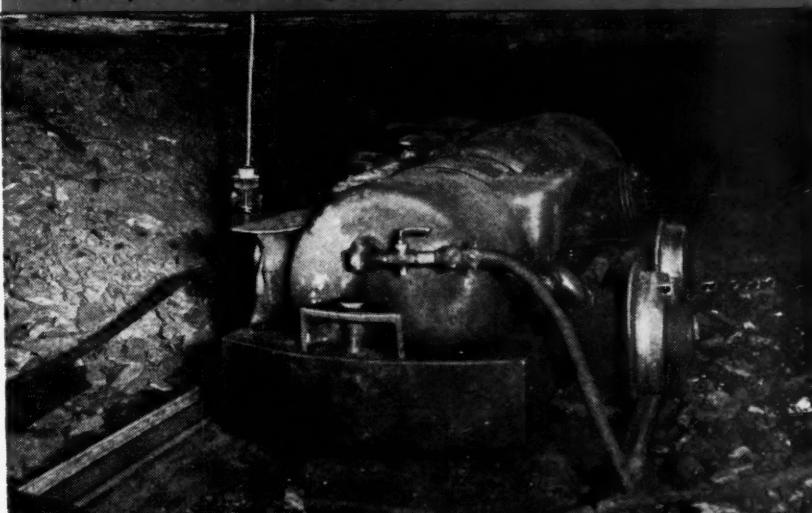


Sullivan WH-114 air compressors are rugged, heavy duty machines that take less floor space . . . deliver air up to 3656 cfm.



Series 80 portable air compressors are most economical for use in sinking shafts, removing rock overburden or in anthracite mining.

Self-propelled Sullivan mine car compressors are low in height, completely enclosed, two-stage, fully automatic for underground use.



SULLIVAN DIVISION
JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH, PA.

NOT WORTH A HOOT!

Until it Reaches the Surface



Avoid track shutdowns

With **MESCOWELD** RAIL BONDS



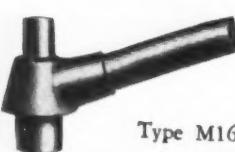
Type M9-F



Type M8-F



Type M10-F



Type M16-F

Rail bonds are small but highly important links in coal production. Upon them depends the smooth operation of your entire haulage system.

MESCOWELD Rail Bonds have proved their dependability in hundreds of installations throughout the coal mining areas. Positive conductivity is assured by flashwelding each wire to heavy wrought steel terminals. 18 types provide for every rail bonding requirement. Write for catalog.

IMMEDIATE DELIVERIES

The most commonly used types of MESCOWELD Rail Bonds are carried in stock by our distributors located in all important coal centers. Other types can be shipped with minimum delay. Specify MESCOWELD for fast deliveries, efficient performance.

You Are Cordially Invited to visit us at the Southern Appalachian Industrial Exhibit, Booth F-18, N & W Freight Terminal, Bluefield, West Virginia, August 22-23-24.

MOSEBACH ELECTRIC & SUPPLY CO.

1115 ARLINGTON AVE., PITTSBURGH 3, PA.

PHONE HEMLOCK 8332

Complete Line of Track and Trolley Products for the Mining Industry

cluded: preparation and grading of coal for market; treatment for decreasing clinkering; improvement of blast-furnace-coke quality; more efficient means of utilizing coal as open-hearth fuel in place of oil; utilization of coke-oven byproducts; and exploration of non-fuel uses for coal by new processing. It was felt the time is approaching for establishment of hydrogenation plants in Nova Scotia to avert dependence on petroleum.

Association Activities

VIRGINIA COAL OPERATORS ASSOCIATION at its 27th annual meeting reelected all its officers as follows: George H. Esser, president and secretary-treasurer; H. W. Meador, vice president and E. H. Robinson, assistant secretary-treasurer. E. P. Humphrey and C. F. Connelly will continue to serve as representatives on the board of directors of the Southern Coal Producers' Association, and Mr. Humphrey was reelected as national councillor with the United States Chamber of Commerce. Members of the board of directors, reelected for another term, are: C. F. Connelly, George H. Esser, R. S. Graham, C. B. Jackson, E. P. Litton, A. R. Matthews, H. W. Meador and J. P. Shockley.

PENNSYLVANIA-ANTHRACITE SECTION, A.I.M.E., at its annual meeting July 13, elected the following officers: Harry W. Montz, Wilkes-Barre, chairman; C. A. Garner, Hazleton, vice chairman; and Floyd S. Sanders, Dallas, secretary-treasurer. Elected to the executive committee for three years were: Joseph E. Ward, Hazleton; Cadwallader Evans, Jr., Scranton; Edward Griffith, Wilkes-Barre; W. C. Muehlhof, Pottsville; and W. E. Conroy, Clarks Summit.

UTAH COAL OPERATORS ASSOCIATION has elected as president A. B. Fougler, general manager, Lion Coal Corp., Ogden, Utah. Other newly elected officers include Walter F. Clarke, general manager, Independent Coal & Coke Co., Salt Lake City, and B. P. Manley, reelected executive secretary. Elected directors of the association were: L. E. Adams, president, Spring Canyon Coal Co., Salt Lake City; A. P. Cederlof, general manager, Peerless Sales Co., Salt Lake City; R. H. Harmer, vice president, Hi-Heat Coal Co.; Terry McGowan, president, McGowan Coal Co.; L. R. Weber, president, Liberty Fuel Co., Salt Lake City; P. L. Shields, vice president and general manager, United States Fuel Co., Salt Lake City; Claude P. Heiner, vice president Utah Fuel Co., retiring head of the association; and Mr. Fougler, the new president.

COLORADO & NEW MEXICO OPERATORS ASSOCIATION at its annual meeting held in Denver elected the following officers: S. M. Thompson, president; Douglas Millard, vice president; George B. Dick, second vice president, and F. O. Sandstrom, secretary-treasurer. Elected to the board of directors were: N. C. Anderson, W. D. Corley, Jr., George B. Dick, Claude P. Heiner, H. E. MacDonald, Douglas Millard, W. G. Moore, E. M. Oliver, L. L. Patton, W. H. Peltier, W. G. Plested, B. W. Snodgrass, S. M. Thompson, W. J. Thompson, and J. van Houten.

Collyer

PORTABLE CABLE



COLLYER Heavy Duty Neoprene Sheathed Portable Cables, highly resistant to flame, chemicals, oil and abuse, fully meet the rigid specifications for mining cables established in the interest of public safety by the Pennsylvania Department of Mines. Designed with maximum flexibility for constant reeling and unreeling, and protected against chafing or abrasion by a tough, smooth jacket, this cable is giving outstanding service on locomotives, cutting machines, loaders, conveyors and every type of mining machinery. Available in Single and Multi-conductor.

Let us know your requirements.

Collyer
INSULATED WIRE COMPANY
245 Roosevelt Ave., Pawtucket, R. I.

These Features mean Safety and Economy:

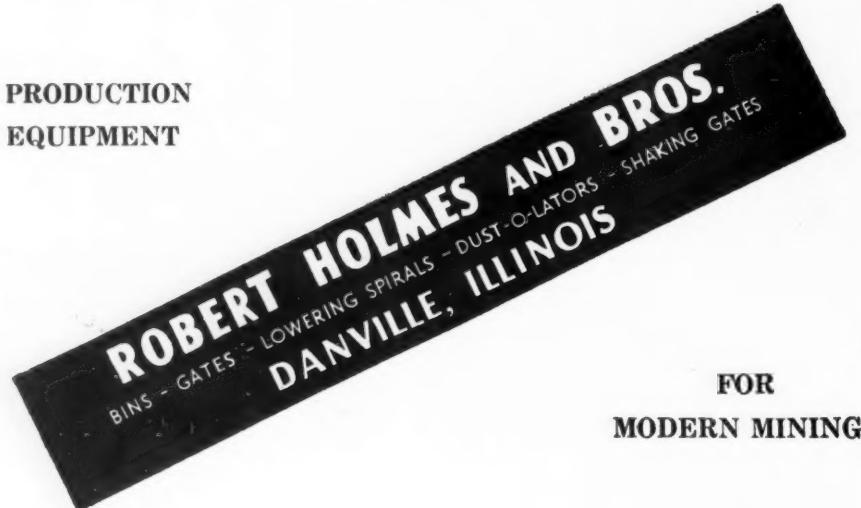
- 1 Lead-cured neoprene sheath, dense, tough . . . resists flame, chemicals, oil and abuse.
- 2 Neoprene cushioning belt, highly resilient, with reinforcing open twine braid.
- 3 Multiple conductors cabled with suitable fillers . . . flexible, easy to handle.
- 4 Heat-resistant rubber insulation . . . safe for heavy overloads.
- 5 Rope-stranded, tinned copper wires give flexibility . . . resist both tension and torsion.

HOLMES ALL-STEEL CAGES

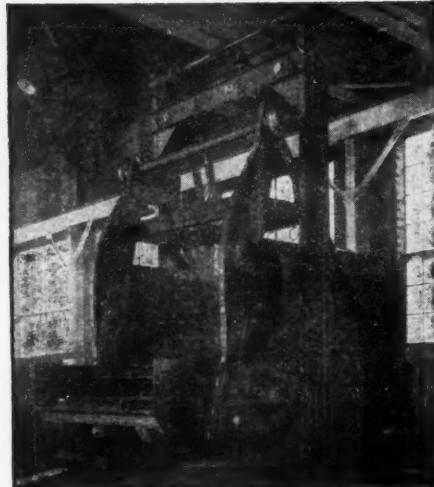
In HOLMES design all operating mechanisms have been simplified as far as possible, both to eliminate dead weight and reduce the percentage of delay from failure of some gadget to function properly. All operating parts are arranged for quick change with ordinary tools.

The car lock requires no special attachments on cars. It is also adapted for use with any of the standard automatic cagers.

PRODUCTION
EQUIPMENT



Self-Dumping



Overturning Type Cage for Use With Solid End Cars

Personal Notes

Frank Enslow, Huntington, W. Va. has been named president of the Lillybrook Coal Co., Beckley, W. Va., which operates four mines in Raleigh County, and president and general manager of the Raleigh Smokeless Fuel Co. Mr. Enslow also holds controlling interest and is president of the Birceton Coal Co., the Utilities Coal Co., and the Buffalo Winifrede Coal Co., all of Huntington. As a result of recent transactions, both the Lillybrook Coal Co. and the Raleigh Smokeless Fuel Co. are now controlled by the Blackstone Coal Co. of Wilmington, Del.

R. T. Teets, previously foreman, Maryland Century Coal Co., has been appointed assistant mine foreman, Indian Coal Co., Century, W. Va.

W. M. Berry, formerly mine foreman at the Industrial Collieries Carolina mine, has been appointed mine inspector in District 4 of Northern West Virginia, to succeed P. J. McGraw, who has become inspector-at-large, succeeding Pete McLinden.

Robert Dahlin has been promoted from maintenance superintendent to production manager, Minds Coal Mining Co., Montereille, W. Va.

Consolidation Coal Co. (W. Va.) has announced the following changes in supervisory personnel: Gustave A. Schweinbraten has been promoted to section foreman, Mine No. 25, Pinnickinnick. At Mine No. 32, Owings, Wayne A. McCurdy, recently released from the U.S.N.R., has been appointed time-study engineer. James A. Mazza has returned to Mine No. 32 as section foreman following four years military service. Parker Davidson has been named section foreman, and A. B. Price, formerly mine foreman, Mine No. 93, mine foreman, at Mine No. 32.

At Consolidation's Mine No. 63, Monogah, Nicholas Eates has been appointed section foreman. Samuel M. Phillips has been transferred from Mine No. 63 to Mine No. 93, Jordan, as fire boss. Harry Turner has been promoted to mine foreman, and Marvin Y. Thorne to assistant mine foreman, at Mine No. 93. At the Arkwright mine, W. O. Barnard, Jr., recently released from the army as a lieutenant, has been made time-study engineer.

E. G. Schell, formerly general superintendent, has been made general manager of mines, Lorain Coal & Dock Co., Columbus, Ohio.

L. F. Workman has been appointed general manager of mines, Lorado Coal Mining Co., Lorado, W. Va.

Governor Simeon Willis has appointed as Kentucky district mine inspectors: Walter Hornsby, Martin; Noah L. Jackson, Tinsley; Minor Evans, Pikesville; and R. D. Brock, Hazard.

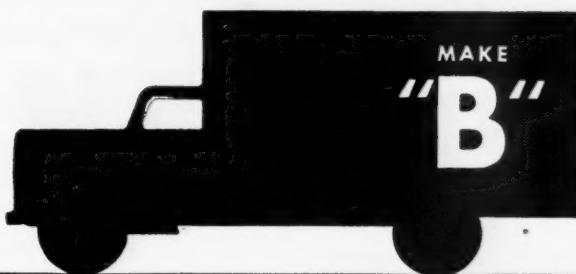
John T. Steele, formerly mine superintendent, Ward No. 2 mine, Kelley's Creek Colliery Co., Ward, W. Va., has been named general superintendent, Milburn Nos. 1 & 2 mines, Milburn By-Products Coal Co., Milburn, W. Va.

HERE'S IMPARTIAL PROOF MACKS LAST LONGEST!

1. FACT: 14% of all Mack Trucks on the road today were built before 1929... every seventh Mack is over 16 years old.



2. FACT: Closest runner-up, make "B" has only 10.3% trucks on the road with 16 years service to their credit.



3. FACT: Make "C" has only 7.8% trucks now in use 16 years.



4. FACT: Make "D" has only 6.6% of their trucks still operating after 16 years.



(The basic figures are from the latest authoritative national survey of truck registrations, by R. L. Polk & Co.)

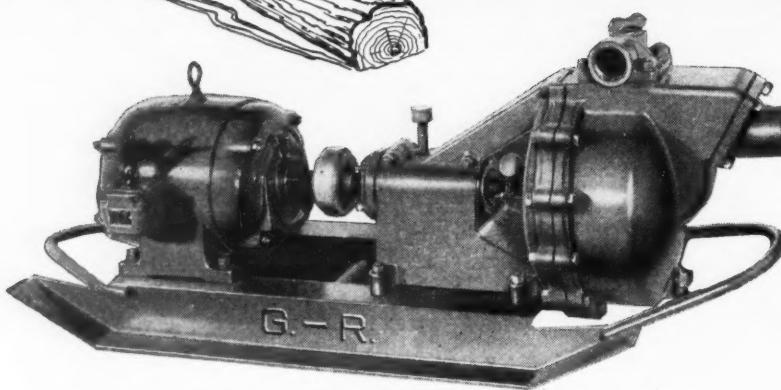
MORE Mack Trucks are still rolling profitably for owners—years after they've paid for themselves in dependable service—than any other make.

Mack
TRUCKS
FOR EVERY PURPOSE



Performance
Counts!

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.



SIMPLE IN DESIGN!
SIMPLE TO OPERATE!
SIMPLE TO MAINTAIN!

The over-all simplicity of design in Gorman-Rupp centrifugal pumps is the best insurance for the mine operator against costly stoppages or maintenance. Moving parts in any machine produce wear. There are only two such parts in a Gorman-Rupp pump - a heavy shaft rotating on anti-friction bearings and an impeller. There are no reduction gears, no sensitive valves. Such wear as occurs takes place in the wear plate and impeller which can be replaced quickly with common tools.

You can operate Gorman-Rupp pumps for months at a time without a rest. They will handle any solids that will pass the intake strainer without clogging or damaging the pump mechanism. These pumps are completely self-priming. Prime is never lost and no adjustment is required between prime and run. Pump may be operated automatically by remote or float control or by time switches.

These husky durable pumps bring to you a reliable, trouble free service so necessary in mine operations.

Gorman-Rupp pumps are made in various sizes with capacities from 4,500 to 15,000 gallons per hour and heads up to 125 feet.

For further information write for a copy of our special mine pump bulletin No. 301-46 or contact your nearest distributor.

THE GORMAN-RUPP COMPANY

 306 BOWMAN STREET, MANSFIELD, OHIO

Distributed by: Guyan Machinery Co., Logan, W. Va. — Weinman Pump & Supply Co., Pittsburgh, Pa. — McComb Supply Co., Harlan, Ky. — Bittenbender Co., Scranton, Pa. — Industrial Supply Co., Terre Haute, Ind. — Hoe Supply Co., Christopher, Ill. — Central Supply Co., Greenville, Ky. — Ebbert & Kirkman Co., Inc., Birmingham, Ala. — Hensley Co., Watertown, Wisc. — Union Supply Co., Denver, Colo.

Joseph Cummings has been appointed superintendent of Mine No. 3, Christian Colliery Co., Mahan, W. Va.

Damon C. Duncan has been appointed superintendent of the central shops of the Consolidation Coal Co. (Ky.), Jenkins, Ky. Mr. Duncan also has been named superintendent of the company's building and rent department, succeeding Jack McClelland, resigned.

Lehigh Navigation Coal Co. has announced several major personnel changes and the creation of a new department of production to provide closer coordination of management, according to Evan Evans, vice president and general manager. C. D. Rubert, superintendent of preparation, has been named assistant to the general manager and will supervise the following departments: preparation, shipping, coal storage, retail coal sales, stores management, medical, safety, workmen's compensation, fire inspection, personnel, police and forestry. D. C. Helms, mining engineer, has been appointed production manager and will be in charge of coal production from all sources, with district superintendents reporting to him.

F. E. Sterner, superintendent of Lehigh's Tamaqua colliery, has been appointed production engineer, with offices in Lansford. He is to be succeeded by T. J. West, formerly superintendent of the Coaldale colliery. Norman Richards, inside foreman at Mine No. 8, becomes superintendent of the Coaldale colliery.

Roy S. Long, formerly general superintendent of the Powellton (W. Va.) division of the Koppers Coal Division, has been promoted to assistant to C. R. Stahl, assistant operating vice president. H. W. Moore, chief clerk in Pittsburgh, has been named to succeed Mr. Long as general superintendent of the Powellton district, with offices at Powellton, W. Va.

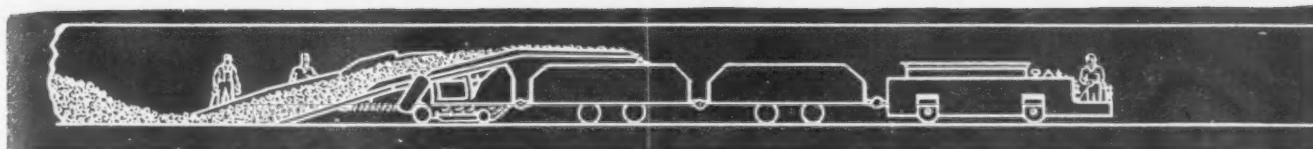
Glenn V. Bearden, formerly associated with the Kingston Pocahontas Coal Co., Hemphill, W. Va., has been appointed superintendent of the Vivian, W. Va., operations of the Peerless Coal & Coke Co. Floyd Hendricks has been promoted to chief electrician for the company's operations at Vivian, and Frank Hubbard has been named mine foreman of its Mine No. 4 at Vivian.

Obituary

T. E. Jenkins, president and general manager, National Fuel Co., Denver, Colo., died July 14 in a Denver hospital, following a heart attack and pneumonia.

Frank Dunning, 53, strip-mine operator, died July 7 at his home near St. Clairsville, Ohio, after an illness of several weeks.

John R. Price, 75, who retired in April after 34 years as mine foreman for the Lehigh Valley Coal Co. and a total of 63 years service with the company, died July 15 at his home in Wilkes-Barre, Pa., following a heart attack.



We make cars to FIT your mines

These are examples of cars designed to meet specific mine conditions—most of them obviously for low headroom.

Enterprise

engineers consider your loading and hauling problems -- then design for you, rugged, well-built cars that deliver increased tonnage, at low maintenance cost.

Your inquiries are solicited.



ENTERPRISE
WHEEL & CAR CORPORATION
BRISTOL, VA.—TENN. HUNTINGTON, W. VA.



While DUST HOG fattens on inefficiency, slowing up workers, ruining machinery, spoiling quality, causing accidents—maintenance costs go up. So the cost of controlling dust can usually be paid for out of savings in maintenance—and often by reclaiming dust by-products.

Clear out those "dust pockets" where DUST HOG is adding to your costs. A free booklet, "Control of Industrial Dust", shows how "plant housekeeping" is easier, cheaper with Pangborn equipment on the job. Write Pangborn Corporation, 288 Pangborn Boulevard, Hagerstown, Maryland—*world's largest manufacturer of dust control and blast cleaning equipment.*

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

John I. Springer, vice president of the Continental Coal Co., Spokane, Wash., died July 26. Mr. Springer had been active in the coal industry of the Pacific Northwest for many years and was prominent in association and other industry activities.

Pete Guthrie, 30, general superintendent, Harlan Fuel Co., Yancey, Ky., was killed July 23 when a rented plane he and a companion were operating crashed near Harlan, Ky.

Coal Publications

Electronics in Industry, by G. M. Chute, 461 pp., 5x8½-in.; cloth. Price, \$5. McGraw-Hill Book Co., Inc. Written by an application engineer of the General Electric Co., Detroit, Mich., this book is based on a study course sponsored by the University of Michigan Extension Service for the instruction of students from industrial plants. It also will be of particular assistance to those who graduated from colleges before radio and electronics entered the curriculum. However, this volume is not of an elementary description.

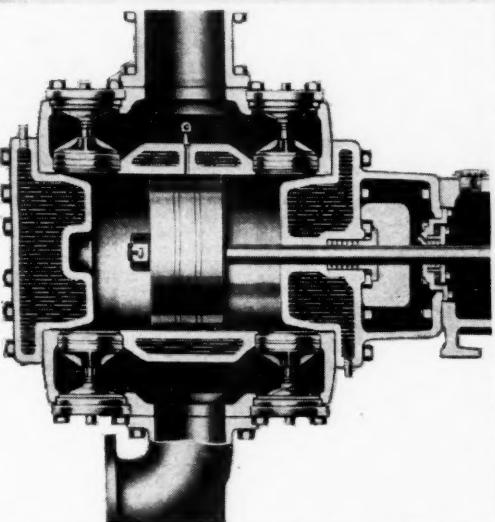
Fundamentals of Alternating Current Machines, by A. P. Sah, 466 pp., 5½x9-in.; cloth. Price, \$5. McGraw-Hill Book Co., Inc. This volume is rather for the operating electrical engineer than for the designer of electrical equipment, though both should profit. Shows the engineer how his equipment may be tested.

Physical and Combustion Characteristics of Packaged Fuel Containing Anthracite Fines, by L. D. Schmidt, W. T. Reid, W. Seymour and J. W. Myers, U. S. Bureau of Mines. R.I. 3882, 41 pp., 8x10½-in.; paper; mimeograph, free. Packaged fuel of sufficient strength for ordinary handling can be made from anthracite fines as sole constituent or from a wide variety of blends of anthracite fines with bituminous coal, using asphaltic binder. However, combustion tests indicated that packaged fuel made from anthracite unmixed with other fuel tended to crumble excessively in burning and that the mixture may require as much as 30 to 50 percent of a caking coal, if it is to produce a block that will burn satisfactorily. The quantity of bituminous coal needed depends on the caking quality of the fuel chosen. In tests, the Glenn Smith process was used and the anthracite was usually mixed with Pocahontas screenings.

Tests of Bituminous-Anthracite Mixtures on Industrial Stokers, by J. F. Barkley, L. R. Burdick and R. Wiggers, U. S. Bureau of Mines. R.I. 3916, 22 pp., 8x10½-in.; mimeograph, free. Use of barley anthracite with the bituminous coal available in the Eastern region of the United States, (1) decreases caking of coal bed; (2) with single-retort stokers, usually reduces stoking attention needed; (3) decreases smoke; (4) usually reduces clinkering; and (5) decreases draft-loss of fuel except with higher-volatile coals and with spreader stokers. On the other hand, it usually increases, (1) quantity of flyash especially with spreader stokers; (2) quantity of combustible in flyash; and (3) may decrease or increase, (a) load-carrying capacity or, (b) efficiency of boiler. With multiple-retort stokers, efficiency usually is

COMPRESSOR CYLINDERS DESERVE AN OIL WITH QUALITIES

like these:



- 1 Low gum-and carbon-forming tendencies to prevent valve sticking.
- 2 Low-temperature fluidity to avoid "dry starting."
- 3 Low volatility to reduce carry-over to air line.
- 4 Rust-preventive properties to protect cylinder walls and rings.

SHELL COMPRESSA OILS

provide all these qualities

GUM FORMING and excessive carbon are usually evidence that an oil oxidizes easily. Shell Compressa Oils are particularly free of these tendencies because of special care in selecting crudes and the use of solvent extraction refining which removes all readily oxidized compounds. Not only is a minimum of carbon formed, but that minimum is soft and fluffy . . . valves stay clean and free.

Fluidity at low temperature is necessary to protect cylinder parts both in starting and before operating tem-

peratures are reached . . . only a well-balanced blend such as Shell Compressa Oil gives cylinder walls protection under all conditions.

Volatility has a lot to do with cylinder oil consumption. Both in the choice of crudes and in refining, those components affording low volatility are selected for Shell Compressa Oils. Result: safe lubrication with minimum feed.

Moisture conditions favorable to rusting exist in compressor cylinders, especially during shutdown. The rust-

preventive properties of Shell Compressa Oils give extra protection to cylinder walls and ring edges at all times.

The Shell Lubrication Engineer will gladly give you specific advice on the lubrication of any type of Compressor. For informative literature about compressed air equipment lubrication, write to Shell Oil Company, Incorporated, 50 West 50th St., New York 20, N. Y.; or 100 Bush St., San Francisco 6, California.

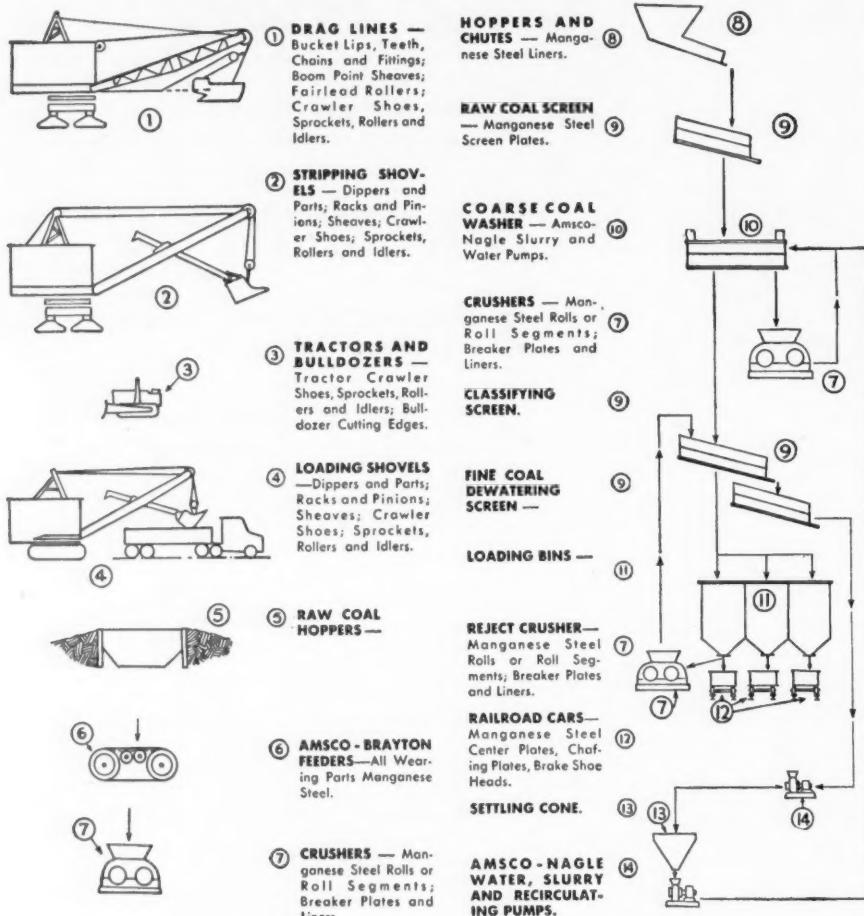
SHELL COMPRESSA OILS



Manganese Steel Appears at Many Points in the Coal Stripping Picture

The "flow sheet" below indicates the various applications of "the toughest steel known" in coal stripping equipment.

The rock and other hard material encountered in the overburden dictate, for operating economy, the use of austenitic manganese steel in the



equipment parts that take the impacts and wearing action.

Experience has proved its value also in maintaining continuous production and keeping maintenance costs down in such preparation equipment as apron feeders, crushers and screens.

Under some conditions, moreover, even prepared coal has sufficient abrasive action to justify, in final costs, the employment of this tough, wear-hard steel for wearing parts in the handling equipment.

However, probably 90% of the manganese steel used by coal mines is in the form of power shovel dippers, and wearing parts for shovels, draglines, and the like. Amsco all-

manganese-steel dippers, both of the welded type and the renewable-lip design, are on the job, on all makes of shovels, in every stripping field in the country.

Send for Bulletin 743-M, "The Toughest Steel Known for Mining and Quarrying Equipment."

unaffected, though in some cases it is increased. Conditions with different mixtures are recorded and the several ways of mixing the fuels are set forth.

Principles of Field and Mining Geology, by J. D. Forrester, 647 pp., 5½x8½ in.; cloth. Price, \$7. John Wiley & Sons, Inc., New York. Describes the causes and nature of geologic phenomena, field-survey practices, instruments, samples and techniques, also maps, models and illustrations. Geophysical methods of survey also have a place. In this excellent book, coal receives little mention and the surveying of coal areas is not considered. In fact, the correlation of seams, and the principles of identifying and surveying deposits that are bedded and still relatively level are not discussed.

Preparation Facilities

DAVIS COAL & COKE CO., Bayard mine, Bayard, W. Va.—Contract closed with Fairmont Machinery Co. for coal-preparation plant, capacity 300 t.p.h. The 5x½-in. size will be cleaned in a Chance cone. After cleaning, it will be separated into two sizes and loaded on two railroad tracks, with facilities for remixing the minus ½-in. raw coal with either of the two clean-coal products. Mine-run coal will be delivered by a belt conveyor discharging into a Bradford breaker that will reduce it to any size ranging from 5 to 2 in. Allis-Chalmers "Ripl-Flo" vibrating screens will be employed to make the ½-in. separation ahead of the cone.

AMERICAN ROLLING MILL CO., Montcoal, W. Va.—Contract closed with Jeffrey Mfg. Co. for washing plant; capacity, 250 t.p.h. of raw mine-run.

BELLEVUE COAL CO., Scranton, Pa.—Contract closed with Deister Concentrator Co. for six No. 7 SuperDuty Diagonal-Deck coal-washing tables for treating No. 4 buck; also one six-way-split Concenco revolving feed distributor and two 4x7-ft. Leahy heavy-duty NO-Blind vibrating screens.

JAYCO & FORMAN, Cold Springs, N. Y.—Contract closed with Deister Concentrator Co. for one Leahy screen for coal screenings.

WILLIAM PENN ANTHRACITE COAL CO., Shaft, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck coal-washing table for handling No. 4 buck.

RED OAK COAL CO., Tremont, Pa.—Contract closed with Deister Concentrator Co. for two No. 7 SuperDuty Diagonal-Deck coal-washing tables for No. 4 buck.

CROW'S NEST PASS COAL CO., LTD., Fernie, B. C., Canada—Contract closed with Deister Concentrator Co. for two No. 7 SuperDuty Diagonal-Deck coal-washing tables for handling ½x0-in. bituminous coal.

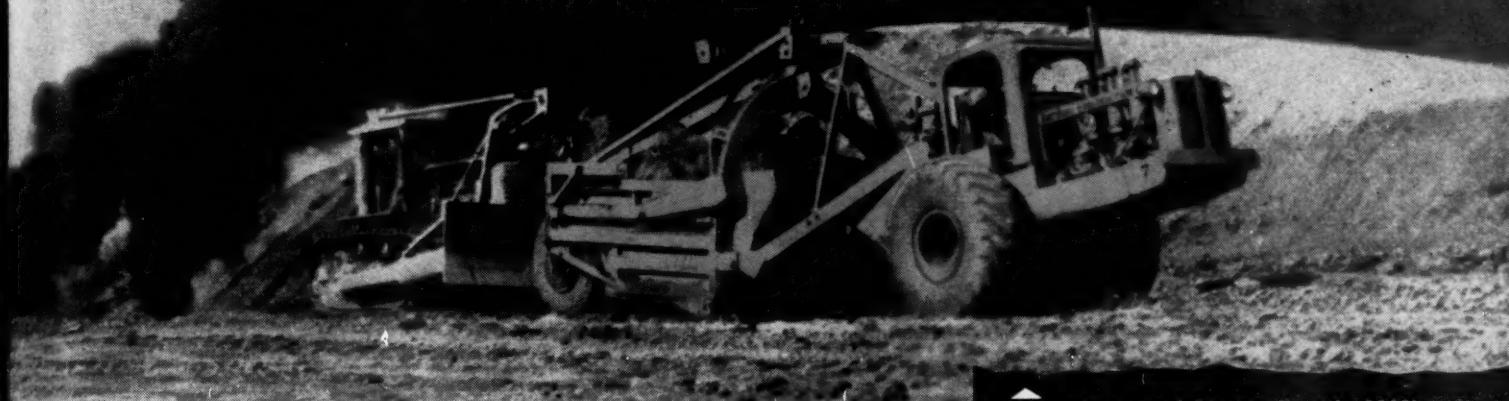
COLITZ COAL CO., Pottsville, Pa.—Contract closed with Deister Concentrator Co. for two SuperDuty Diagonal-Deck coal-washing tables, one treating rice and one No. 4 buck.

BLACK DIAMOND COAL MINING CO., Black Diamond, Ala.—Contract closed with Deister Concentrator Co., for eight No. 7 SuperDuty Diagonal-Deck coal-washing tables handling ½x0-in. bituminous coal; also one Concenco revolving feed distributor.

AMSCO
Foundries at
Chicago Heights, Ill.; New Castle, Del.;
Denver, Colo.; Oakland, Calif.;
Los Angeles, Calif.; St. Louis, Mo.
Offices in Principal Cities
AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS • ILLINOIS

AMERICAN
Brake Shoe
COMPANY

TOURNAPULLS speed fire fighting in Pennsylvania Coal Mine



FIRE in pillar coal left in abandoned workings of a mine near Bradenville, Pa., spread dangerously toward Pennsylvania R.R. main line still underlaid with solid coal. Pennsylvania called in Latrobe Construction Company, prominent road builder and stripping contractor, to cut a half circular fire trench 1000' long, 65' deep and 40' wide around the acre of fire area and to backfill with non-combustible material. "Rush" was the order and Latrobe brought in all available equipment and gave the job the gun. Critical borrow and backfill was assigned to three high-speed Tournapulls.

Tournapulls make 1200' cycle every 5 minutes

Tournapulls heaped loads of tough surface clay and fine shale from nearby hillside borrow pit, entered trench down steep ramp; spread 6" lifts in fire trench in layers 11' wide . . . average spreading time 30 seconds. They then continued through

the trench; traveled 500' along macadam highway . . . climbed a 7% grade . . . then swung back to the borrow. Average round trip cycle of 1200' was completed every 5 minutes!

Tournapulls' rubber tires compact fill

Compaction of fill was important to insure complete removal of all voids to eliminate any possibility of fire or air draft creeping across trench. Careful check showed that rolling action of Tournapulls' large-diameter tires accomplished this result effectively without aid of other compaction equipment.

On any type of mining where haul or rehandling of earth is involved, high-speed Tournapulls are your lowest-net-cost-per-yard answer . . . in all materials . . . over long or short hauls . . . under tough mine conditions. Your LeTourneau Distributor has job-proven facts and figures available to you on all types of earthmoving. See him today about your present job.

One-man operated Tournapull made 1200' cycle — load, haul, spread and return — every 5 minutes.

Spreading surface clay and fine shale in fire trench, Tournapulls' big rubber tires gave ample compaction to eliminate voids.



Tournapull dirtmoving method and flexibility saved time on fire fighting . . . also save money on many coal stripping, drainage and other mine operations.



LETOURNEAU
PEORIA, ILLINOIS



TOURNAPULLS

Trade Mark Reg. U.S. Pat. Off. - U.S.A.

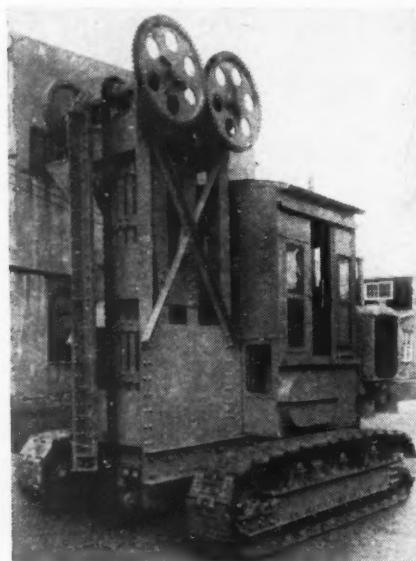


Equipment News

Coal-Pinning Machine

A coal- and cap-rock pinning machine, said to eliminate the coal shooter, driller, powder, electric caps and air compressor, is being manufactured by the United Iron Works Co., Pittsburg, Kan. The manufacturer states that it is now in use in a number of strip mines in Kansas, Missouri and Oklahoma, and that it has been proven in eliminating the hazards of shooting the coal and cap rock, lowering insurance rates and saving manpower.

The new machine is mounted on two crawler tracks self-propelled by either gasoline or diesel engine or diesel-electric combination. The pinning weight is operated by roller chains with lifting lugs attached to the chain to raise the weight, and is dropped nine times per minute. A 5-in.-diameter pin in the bottom breaks the coal or cap rock. The machine has a travelling speed of 88 f.p.m. forward or backward.



Weight and crawlers are operated through large twin-disk clutches and the machine also is equipped with a steel hood to protect the operator during bad weather.

Wire-Rope Vise

A new Cabl-Vise that forms a loop in wire rope by simply turning one hex nut with an ordinary wrench has been announced by the Nunn Mfg. Co., Evanston, Ill. The vise is said to automatically compensate for rope sizes within its designed range and hold the loop firmly through the splicing or clamping operations. The Cabl-Vise is equipped with a swivel base that



accommodates the vise in either vertical or horizontal position and rotates through 360 deg., clamping firmly in any desired direction. Cabl-Vise No. 1 takes rope sizes $\frac{1}{4}$ in. through $\frac{1}{2}$ in. Cabl-Vise No. 2, equipped with hydraulic booster and accommodating rope $\frac{3}{8}$ in. through $1\frac{1}{2}$ in., will be announced shortly.

Idler

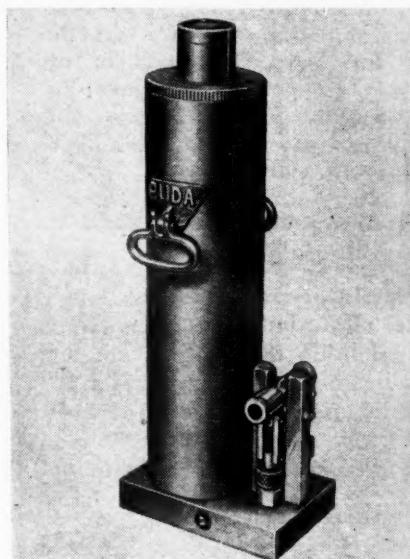
A new belt-conveyor idler, known as the Rex roller-bearing-style No. 55RC rubber-covered spiral-return idler, has been announced by the Chain Belt Co., 1600 West Bruce St., Milwaukee 4, Wis. This special idler was designed to combat many of the faults frequently experienced when ordinary-type return idlers are used under extreme conditions where freezing and ice formation or unusual abrasion are problems, the company states. The idler is built of a flat-bar steel helical spiral, covered with rubber. The rubber used as the spiral covering is specially extruded and is simply opened up and snapped over the bar. Thus, replacement of the rubber, right on the job, is said to be a simple matter. Each end of the roll is equipped for high-pressure grease lubrication and is regularly furnished with a hydraulic-type fitting.

This new idler greatly retards icing of the rolls in freezing weather because of rubber-to-rubber contact. Furthermore, says the company, what ice that may form tends to

be loosened by the ever changing point of contact between the belt and spiral. Abrasive and corrosive action, such as results when coke breeze or salt is handled, is reduced to a minimum by the rubber-to-rubber contact between the idler and the conveyor belt. It is further stated that, when sticky materials are hauled by the belt, there is no "build-up" on the spiral because of the shifting point of contact which tends to work the material loose.

Hydraulic Jack

The Buda Co., Harvey, Ill., has announced the addition of 50-ton hydraulic-journal jacks to their line. The jacks have two distinct speeds—fast for quickly raising light or medium-heavy loads and normal or standard for raising capacity loads. The raising of loads is by easy pumping action, it is said, and lowering is regulated

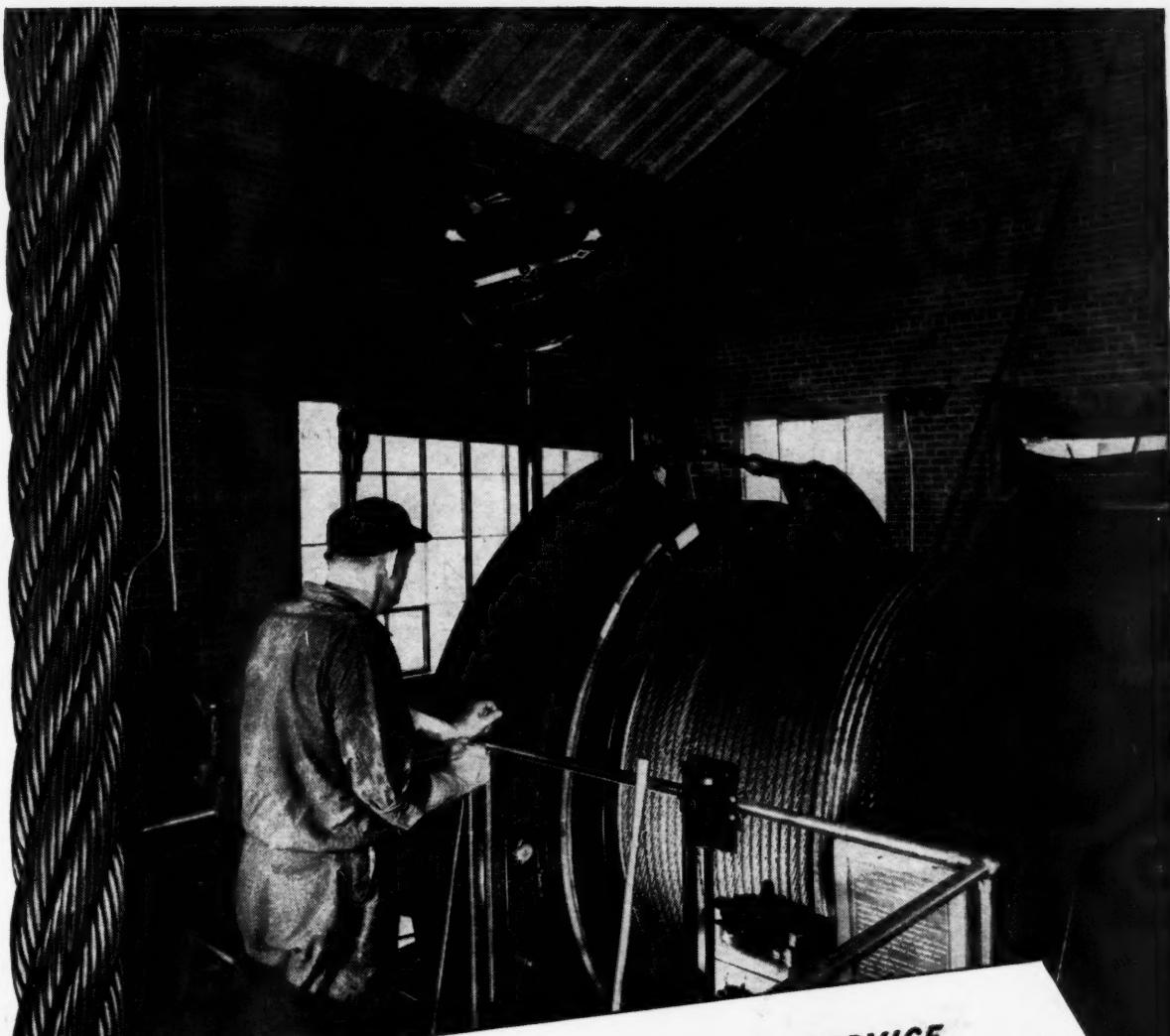


by a simple control valve that keeps the loads under complete control of the operator. Loads may be held indefinitely at any height. Model 50-B-12 has a height closed of 12 in., a rise of 7 in., and weight of 120 lb.; Model 50-B-26 has a height closed of 26 in., a rise of 20 in. and a weight of 200 lb.



Slurry Pump

A new Type R slurry pump available in 2-, 3-, 4-, 5- and 6-in. sizes, has been announced by the Morris Machine Works, Baldwinsville, N. Y. According to the man-



Precisionbilt FOR LONGER SERVICE
J&L WIRE LINES
PERMASET PRE-FORMED

The Focal Point of Profitable Mine Operation

The entire effort of your underground personnel and equipment is devoted to feeding your production hoist. A dependable operator, efficient and reliable machinery, and the *best* in wire rope—these are your assurance of uninterrupted production. Shaft mine operators obtain greatly increased tonnage from J&L Precisionbilt Lang Lay PERMASET hoist ropes. Improve your winding practice by specifying J&L Precisionbilt wire rope—made for longer service from J&L Controlled Quality steel.

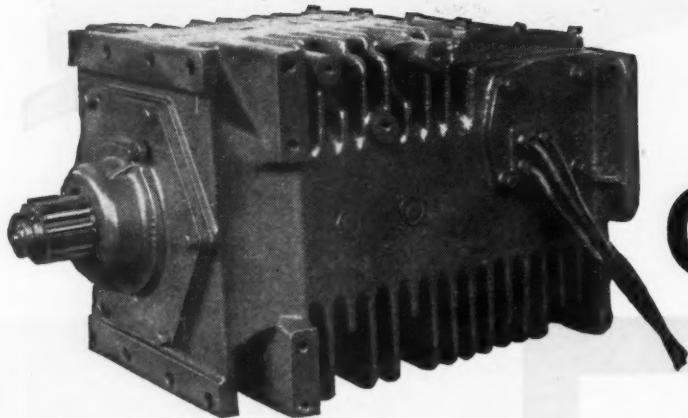
**J&L
STEEL**

JONES & LAUGHLIN STEEL CORPORATION
GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

RELIANCE MOTORS POWER 70%



Reliance D-c. Explosion-proof Mine Motor, specially designed for loading equipment.



Reliance Fully-enclosed, Fan-cooled D-c. Mine Motor for use on permissible underground equipment.



Reliance Fully-enclosed, Fan-cooled D-c. Motor for use where permissible equipment is not required.

of All COAL LOADERS

Here's acceptance based on measuring up to every performance standard which counts in coal loading service.

Each Reliance Mine Motor is designed electrically and mechanically for its particular job—with vital parts thoroughly protected against coal dust and moisture. On loaders, conveyors, shuttle cars, and preparation equipment in the tipple, these rugged motors are helping to maintain high production with a minimum of maintenance.

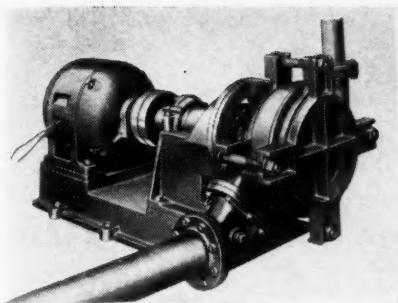
Specify Reliance Motors on your equipment. You can't make a better choice.

RELIANCE ELECTRIC & ENGINEERING CO.
1055 Ivanhoe Road • Cleveland 10, Ohio

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Denver • Detroit
Gary • Greenville • Houston • Kalamazoo • Kansas City • Knoxville
Los Angeles • Milwaukee • Minneapolis • New Orleans • New York
Philadelphia • Pittsburgh • Portland, Ore. • Rockford, Ill. • St. Louis
San Francisco • Seattle • Syracuse • Tampa • Tulsa • Washington, D.C.

RELIANCE MOTORS

"Motor-Drive is More Than Power"



ufacturer, the unit handles all types of mixtures containing abrasive solids and chemicals in suspension, including acid slurries and sludges, caustic liquors and milk of lime, as well as slurries containing soda ash or concentrates, tailings, slag, residue from filters and classifiers, coal, silt and washery solids.

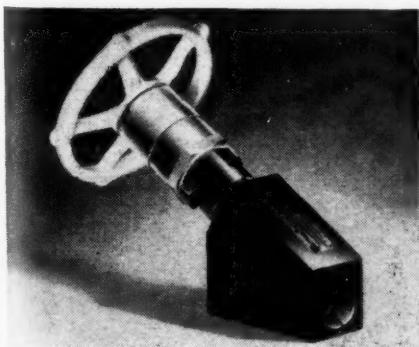
The pump takes its suction from the drive side and thus, according to the company, its packing is subjected only to the suction or positive-head pressures. This means, it is stated, that the pump operates equally well under high suction lift or a positive head, and that it may be connected directly to any tank or cut into the line as a booster pump without an intermediate pressure tank or a suction hopper.

First-Aid Kit

Medical Supply Co., 75 West Van Buren St., Chicago 5, offers the No. 5 Finger-Tip first-aid kit, said to have features that recommend it to mines, shops and the like. Unit packages of dressings and medication for ordinary emergencies are grouped together in full view and instantly selectable, as are bulk surgical dressings and medication for larger injuries. The rubber-gasketed steel case is dust- and moisture-proof. Shelves are undercut and there is space between them so that even stubby fingers can remove them at once. Even the vari-sized adhesive tape is mounted on a built-in axle. Materials may be ordered separately to keep case filled. Steel-cased, weighing 12 lb., the kit has wall brackets, carrying handle, spring locks and ample work shelf.

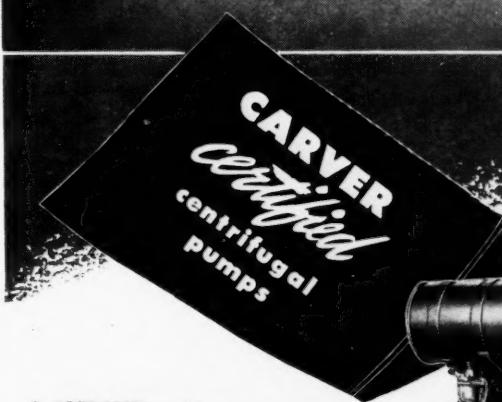
Valves

Grove Regulator Co., 65th & Hollis Sts., Oakland, Calif., has announced a new series V and VL valves, said to represent a marked advancement in valve design. Extreme 30-deg. valve-body design in the globe pattern effects a minimum change in the direction of flow through the valve and, likewise, turbu-



HERE'S ANOTHER REASON WHY CARVER PUMPS ARE BETTER

ONLY 2 PARTS TO Wear



UNLIKE ordinary pumps, Carver Pumps have only two parts that are subject to wear—the impeller and liner. Both are designed to keep wear to a minimum. The impeller vane can wear only on one side. Backhead of the pump lasts a lifetime because impeller does not wear against it. When wear eventually occurs in the impeller and liner, they can be replaced easily, quickly and at low cost thus making the pump as good as new.

Carver Pumps are offered with a choice of power and mounting in sizes from 1½" to 10". Write for catalog.



CARVER PUMP CO.
Muscatine, Iowa

NEW LIFE FOR OLD CABLES

7 Point Superiority



- 1 Double grip . . . both sides adhesive.
- 2 Great tensile strength . . . tough.
- 3 Won't tear, ravel or pucker.
- 4 Resists abrasion.
- 5 Acid- and alkali-proof.
- 6 Extra thick . . . one layer insulates.
- 7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

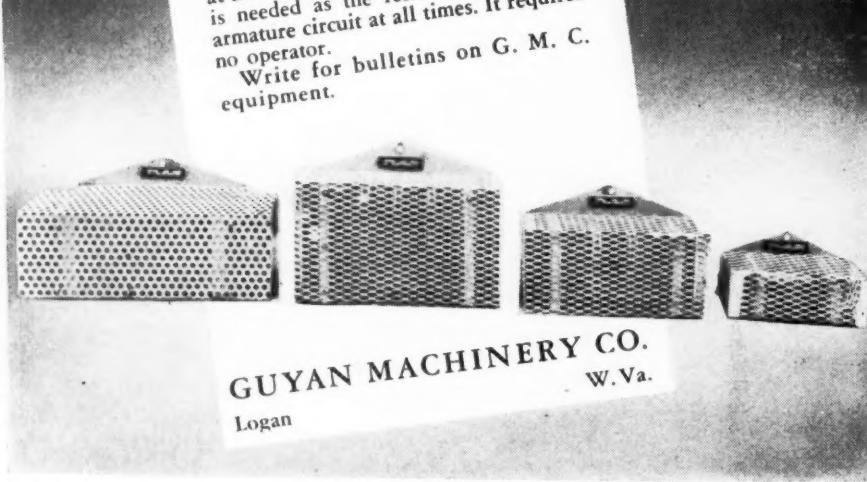
RUBEROID INSULATING TAPE

The RUBEROID Co., Executive Offices, 500 Fifth Avenue, New York 18, N. Y.

G.M.C. Choke Starting Resistances for smoother starts with no arcing

G. M. C. Choke Starters feature a resistance coil connected in series with the armature of a D. C. motor. Resistance is adequate to choke back the initial inrush of current when a motor is connected directly across the line, or when a circuit breaker has been out and recloses on the motor. This permits the motor to start smoothly with no arcing at the commutator. No automatic switch is needed as the resistor stays in the armature circuit at all times. It requires no operator.

Write for bulletins on G. M. C. equipment.



lence is almost entirely eliminated, as the flow stream is carried through the valve in the direction of closing, according to the manufacturer. Expansion takes place directly into the downstream line after the flow has passed through the valve. Thus wire drawing and cutting action is almost entirely removed.

A solid one-piece stem and plug is employed to effect absolute tight shut-off when closed, and all shocks are absorbed by a multiple full-threaded section of the hand-wheel and yoke. Essential operating parts of the valves are provided constant lifetime lubrication by a special factory-sealed process. This new design in 30-deg. globe and 90-deg. angle patterns is provided in Full-stream quick-opening shutoff valves; Micro-stream throttling valves; Coldstream shutoff valves; internal and external check valves; and strainers. Complete details are available from the manufacturer in Bulletin 5060.

Welder

By utilizing the inbuilt separate exciter of the Hobart electric-drive welder, Hobart Bros. Co., Troy, Ohio, has produced what it describes as a compact, high-performing synchronous-motor welder. The unit is so proportioned that it can be started across the line and automatically synchronizes itself by the build up of the separate exciter, it is said. The starting current is approximately the same as with a conventional induction motor of the same horsepower.

The manufacturer recommends that this unit be operated to draw leading current at no load to compensate for other low-power-factor loads. This unit with its unity or leading power-factor characteristics makes it a power-saving load, both from the standpoint of the utility and the customer.

The motor of the welder is a Hobart revolving-field synchronous unit, furnished with a heavy squirrel-cage winding for easy starting as a conventional induction motor. Once up to speed the exciter builds up and automatically applies correct excitation to motor fields. This machine can also be used as an a.c. generator for the operation of small tools, lathes, grinders, etc.

Safety Equipment

American Optical Co., Southbridge, Mass., has announced new safety equipment which includes safety goggles, gloves, mittens, a cover-mitt, hand pads, a sleevelet and finger cots. The new goggles include a Duraweld goggle for welders; a Duralite gog-





Mr. Operator . . . check SERVICE-ABILITY, point for point, before you buy a loader!

When writing the check to pay for the machine it's too late to find out if the loader you got is the one best adapted to your mine. One weak feature . . . one weak link, in the chain of SERVICE-ABILITY necessary to meet your requirements, means inefficiency in operation.

Do this, if you are planning on buying a loader. Write down the SERVICE-ABILITY requirements a loader must meet to do a complete job for you . . . about as follows:

- 1st—I want a loader that will load any size lump of coal that will pass through my tipple.
- 2nd—I want it to load any lump of rock my cars, aerial tram, or larries can take, and do it consistently.
- 3rd—And, I want it to give me maximum efficiency in either of the above services.

4th—I want a Parallel Lift rear conveyor for maximum loading height in limited head room.

5th—I want a safe loader—one that can be used at full efficiency in close timbering and narrow places without fear of knocking out timbers or crushing men.

6th—I want a loader that will give me maximum service with minimum power consumption—only 1/5 KWH Per Ton of material loaded.

If the above "I want" list of features cover your requirements, just remember that only the Whaley "Automat" meets all six of these vital "musts". Each one is a full size, strong link in your chain of requirements for full SERVICE-ABILITY.

Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for Manufacture and Sale in Great Britain and Europe.

MYERS-WHALEY COMPANY

KNOXVILLE 6,

TENNESSEE

Mechanical Loaders Exclusively For Over 38 Years



Employers are Human, too!

Mr. Employer, do you have your daily operations insured from an employer-employee standpoint?

Workmen's Compensation is necessary, and in most cases compulsory... then there are individual or group policies for your personnel... and our new Underground Property Damage policy that protects YOU against loss or damage to all equipment underground—damage to shafts, passageways, retimbering

and repairing inside structures—plus damage to property above ground as result of an explosion underground.

Our Safety Engineers, authorities in their field, offer you suggestions as to the prevention of accidents in your operations.

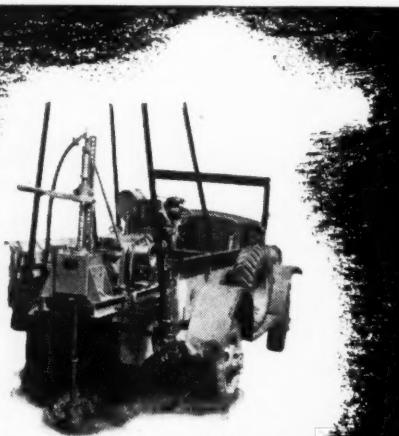
We are proud of our record of claims service—not only for coal mining companies, but for commercial and industrial organizations, too. From the most serious claims to the smallest ones, we keep in mind the rights of the employer as well as the employee.

For detailed information about these particular policies and others, please write or phone your local insurance agent.



COAL OPERATORS CASUALTY COMPANY
GREENSBURG, PA.

CORE DRILLING FOR COAL



Keep down cost per foot by using Acker light-weight, sturdy core drills—simple to operate and easy to move in rough country.

.....

Ideal for determining nature and depth of over-burden before strip mining. Accurate cores of coal seams by using single or double tube core barrels. Will operate diamond—alloy—steel shot bits.

.....

Choice of mountings—trailer—truck—drag skid.

.....

Drill tools and equipment for coal and mineral prospecting and all subsurface exploration.

.....

Send for literature

ACKER DRILL CO. SCRANTON 3, PA.

gle for eye protection against flying objects; a chemical goggle; a dust goggle; and a Fits-on goggle for protecting spectacle-goggle lenses against pitting and scratching. The gloves include a heat glove for jobs requiring hot handling, a welder's glove and a glove for rough wear on all purpose jobs.

The mittens include a heat mitten especially designed for drop-forging, die-casting and bending-block work. The cover-mitt fits over gloves and mittens and is designed to add materially to their life while the hand pads are designed to be worn over cotton or light-weight leather gloves. The leather sleevelet provides arm protection on heavy duty jobs; the Sta-Set finger cots protect both front and back of fingers. Descriptive literature is available from the company.

Roller Bearing

Development of a new type roller bearing, technically known as a spherical-roller thrust bearing, capable of carrying heavier loads at higher speeds and lower temperatures has been announced by SKF Industries, Inc., Philadelphia, Pa.

According to the manufacturer, it will also ease maintenance and operating problems on large vertical water pumps, electric generators and other highspeed machines. Other important applications include various types of gear drives.

The bearing's self-aligning principle is said to compensate for any shaft deflections, distortions or weaves and permit heavy loads to be distributed evenly over all rollers and eliminates danger of overloading. Because of its compactness, it utilizes less space and is lighter in weight than a plain bearing. Ability of the new bearing to carry heavy loads at high speeds is possible because of unique design which permits more effective lubrication. Another feature is a cage retaining sleeve pressed into the bore of the inner ring, making a contained assembly of the rollers, cage and inner ring.

Power-Feeder Switch

A multiple-blade power-feeder switch, with two coil springs attached to the handle for quick circuit breaking, has been made available by Mosebach Electric Supply Co., 1111 Arlington Ave., Pittsburgh 3, Pa. The quick-break feature instantly snuffs the arc and prevents burning of the switch, it is said.

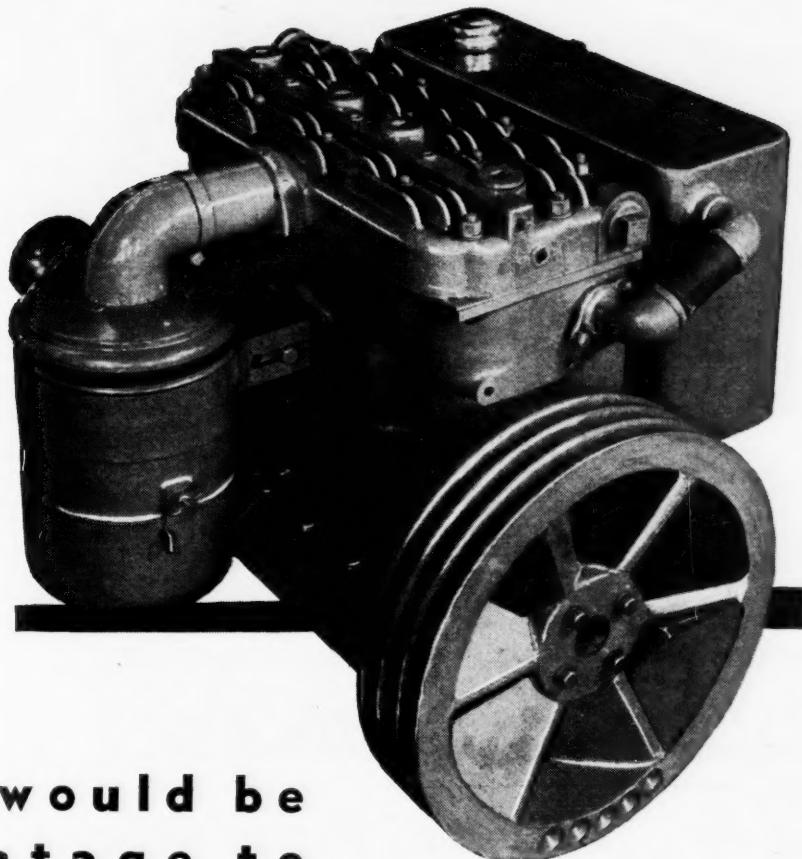
Designed for use in mine trolley and feeder circuits where a wide break is desired, the new switch is capable of carrying up to 1,600 amp. in the four-blade size, 1,200 amp. in the three-blade size, and 800 amp. in the two-blade size.

The new switches are for rib or wall mounting and are of the front-connected non-fused single-pole type. They are equipped with set-screw clamps for gripping cable and no separate terminals are necessary for connecting feeder cables. According to the manufacturer, the clamps will firmly hold all sizes of cable from 500,000 to 1,000,000 cir.mil.

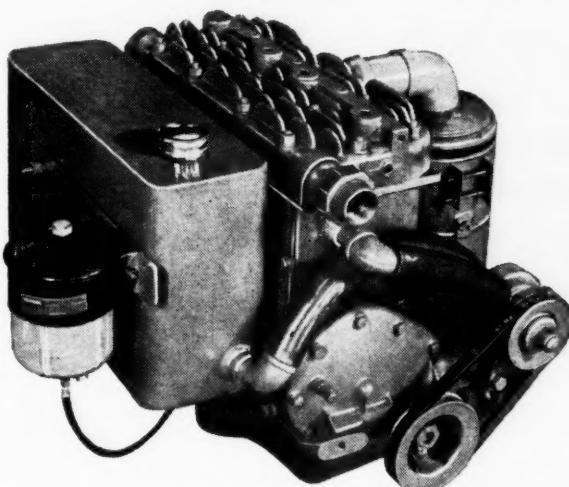
Correction

An item in the May Coal Age (p. 222) concerning the new remote control for speed

"IF YOU PAID DOUBLE ITS PRESENT PRICE—



—it still would be
an advantage to
buy CANTRELLS"



The illustrations above show both end and side views of the Cantrell compressor assembly used in each of the five Cantrell Compressor outfits designed for every coal mine requirement.

It is important that coal mine officials know about Cantrell Air Compressors, not only because of their dependability but because of their low maintenance costs.

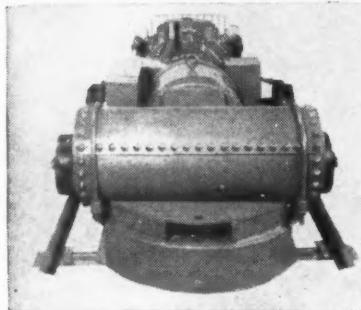
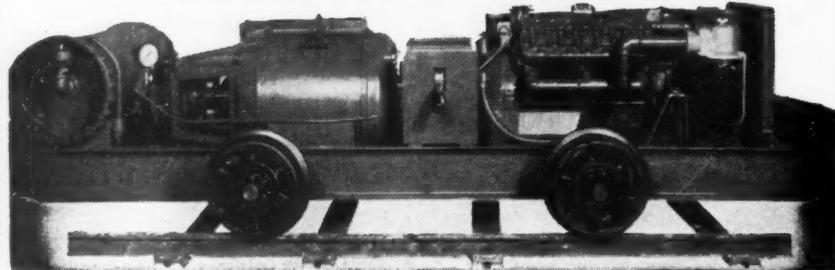
In air compressor service it's the compressor itself that takes the "punching". So, to assure you minimum maintenance cost Cantrell offers you a factory rebuilt compressor exchange plan, permitting replacement of compressor unit at small cost—about \$7.00 monthly, even if you had to change your unit annually.

This exchange plan applies to any Cantrell outfit, whether it be the self-training or standard track type or rubber tired wheel type outfits.

Cantrell
COMPRESSORS

IMPERIAL-CANTRELL MFG., CO. JELlico, TENN.

ACME "LOWBOY" Mine Car COMPRESSOR



REAR VIEW OF COMPRESSOR

Above view shows location of air receiver which is A.S.M.E. riveted type. Each end of outfit is provided with coupling for towing.

- A lightweight — compact — low height mine car compressor which delivers 92 cu. ft. of air per minute at 100 lb. pressure. The unit is driven by a 25 HP compound wound motor. Operating speed 1140 R.P.M.—voltage either 230 or 500 D.C.

The Acme "Lowboy" is specifically designed to meet the needs of present day mining especially mechanized properties. Being low in height it is adaptable to both high and low seam operations.

Bulletin No. 3920 gives complete description of unit and its many advantages in modern mining. Write for your copy today.

ACME COMPRESSOR CO.
Williamson, West Virginia

Prepare Now for Winter Freeze-Ups

LEARN HOW
RADIANT HEAT
from HAUCK
THAWING PITS



Hauck Oil Burners fire into refractory-lined pit directly under the hopper; flame regulated so it never touches hopper.

THAWS COAL CAR HOPPERS IN 20 TO 30 MINUTES

- Speeds Dumping
- Cuts Down Labor
- Avoids Car Damage

No need for expensive, inefficient, time-consuming thawing with torches. Indirect radiant heating the Hauck way quickly thaws out 2-, 3- and 4-hopper cars without damage to hoppers, air brake cylinder packings, etc. Enthusiastic coal operators report fuel oil cost of less than \$1 to thaw a car. Hauck Thawing Pits pay for their cost in one winter on labor savings alone. Bulletin 1040 tells plenty more. Write

THAWING EQUIPMENT

HAUCK MANUFACTURING CO.

Torch Burners · Thawers · Melting Kettles · Forges

111-121 TENTH STREET

BROOKLYN 15, N. Y.

changers manufactured by the Yardney Laboratories, Inc., 105 Chambers St., New York 7, N. Y., incorrectly designated it as "Electrol." The correct designation is "Flectrol."

Industrial Notes

AMERICAN CABLE & HAZARD WIRE ROPE DIVISIONS OF AMERICAN CHAIN & CABLE CO., INC., has named Emerson H. Todd, formerly Chicago district sales manager, sales manager, succeeding Frank W. Benis who resigned to enter another line of business in Omaha, Neb. George Gunther, who has returned to the company after service with the armed forces, has been appointed Chicago district manager succeeding Mr. Todd.

RELIANCE ELECTRIC AND ENGINEERING CO., Cleveland, Ohio, has announced the retirement of A. M. MacCutcheon, senior vice president, as an officer and director of the firm. Mr. MacCutcheon plans to devote his full time to certain special projects of his own, but will, it is understood, remain available to the company as a consultant.

FAIRBANKS, MORSE & CO., Chicago, has announced the retirement of A. E. Ashcraft, for many years vice president in charge of manufacturing. Mr. Ashcraft continues as a director of the company. C. H. Morse, III, vice president, has been placed in charge of all manufacturing plants and operations. Henry M. Haase has been appointed manager of the Beloit, Wis., works of the company following the resignation of A. C. Howard.

HERCULES POWDER CO., Wilmington, Del., has named Clifford T. Butler superintendent of its Hercules, Cal., plant to succeed Leroy P. Hall, resigned. Mr. Butler, will be succeeded as superintendent of the Hercules plant at Bessemer, Ala., by Eustace St. P. Bellinger, who was assistant superintendent at the Hercules, Cal., plant before entering active military service in 1942.

MCNALLY-PITTSBURG MFG. CO., Pittsburgh, Kan., has announced that C. H. J. Patterson, consulting engineer, has departed by air for Rio de Janeiro, Brazil. He has been called there for consultation with officials of Siderurgica Nacional for consideration of further expansion of the coal-preparation plant at Tubarao, Brazil.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind., has elected Paris E. Letzinger, with the company for 13 years, a director following his retirement as vice president in charge of distribution because of his health. Paul Merkert, Jr., and Robert Miller, who joined the Cummins company upon their release from active duty with the United States Navy, have been named to the sales engineering staff.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has augmented its staff of field welding engineers with the addition of Gordon Appleby in the Philadelphia office, Terril S. Hoffman in St. Louis, and E. James Langhur in Chicago.

MARMON-HERRINGTON CO. INC., Indianapolis, Ind., has announced the retirement of Bert Dingley as president of the company. He is to be succeeded by



A WINNING TEAM

BRINGING TEAMWORK TO THE COAL BUSINESS

Calcium chloride has been used for years by many of the leading mines, for dustproofing and freezeproofing coal. They have found it effective and economical and have pleased thousands of users with this clean, odorless and safe treatment.

CALCIUM CHLORIDE ASSOCIATION, 4145 Penobscot Building, Detroit 26, Mich.

MANY OTHER USES BY MINE OPERATORS

Dust Control for
Inside haulage roads
Return airways
Outside roads
Playgrounds
Parking areas
Separation medium for coal washers
High early strength concrete



CALCIUM CHLORIDE

DUSTPROOFS AND FREEZEPROOFS IN **1** OPERATION

**INTERESTED
IN LONGER
BEARING SERVICE?**

As specialists with a specific formula for each application, we give you a money back guarantee of longer service and lower maintenance cost.



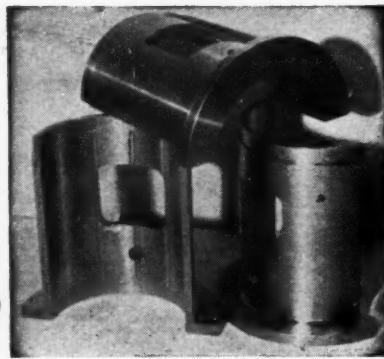
**AXLE BEARINGS
JOURNAL LINERS
BUSHINGS AND
WEARING PARTS**

for all coal mining equipment

JEFFREY • GOODMAN • WESTINGHOUSE •
JOY • GENERAL ELECTRIC • SULLIVAN •
OLDROYD

PROMET CASTINGS

to your patterns. Any size, shape or section, up 3,000 lbs. each. Pattern making, designing, machining.



BAR STOCK

round, hexagon, square. Rough cast, semi-finished. Cored stock all sizes (by $\frac{1}{8}$ " steps) from $\frac{1}{2}$ " minimum core to 12" O.D. and 12" lengths. 6 grades of hardness.

**PROMET MINE
SPECIAL BABBITT**

Lead base, all virgin metals, perfectly alloyed. Fine, velvety grain. Entire bearing surface wears uniformly, without pitting. Unaffected by moisture. Simply heat to 900° - 950° F. and pour. Can be repeatedly remelted and re-worked. Reheating only refines it. No appreciable shrinkage, hence better contact with supporting shell, a more solid, rigid bearing. Supplied in 10 lb. pigs.

Write for free folders.

THE AMERICAN CRUCIBLE PRODUCTS COMPANY

1307 Oberlin Avenue • Lorain, Ohio, U. S. A.

RECKLEY, W. Va., The Universal Supply Co., 1287 S. Kanawha St.
Phone 3642
Other Representatives
Phone 3-8624
Box 290
Box 183
WILLIAMSON, W. Va., Williamson Supply Co.

LORAIN, OHIO, The American Crucible Products Co.
Phone 5983
DENVER, COLO., Urschert Service, 16th St. at
MT. LEBANON, PA., J. E. Nease, 1720 Rosslyn Ave.
WHEELING, W. Va., Felsch & Company, 110-111 Fidelity Building
Phone 1200

Phone Main 0231
Phone LE 9576
Phone 1795

FLEXIPIPE

The improved flexible tubing for
mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by a more rigid means of face ventilation.

Write for free sample and full information

BEMIS BRO. BAG CO.

412 Poplar Street, St. Louis 2, Mo.

MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Double knee-action; better trackability. Floating power; less power consumption. Quick acting footbrake — essential for quick stopping, especially behind loading machines. Brake shoes that follow wheels (due to knee-action). Adjustable Timken Bearings throughout.



Huskiest transmission in any storage battery locomotive. Oil-tight; leakproof. Use regular auto oil change every 6 months. Strong. Simple design. Low maintenance cost. Backed by over 25 years of experience with Storage Battery locomotives.

GREENSBURG "MONITOR"

Franklin County Coal Corporation at Royalton and Herrin, Illinois, have 12 of our Monitor type, storage battery locomotives.

All Greensburg Locomotives are CUSTOM-BUILT to your requirements

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.

David M. Klausmayer, who has resigned as plant manager of Chevrolet Commercial Body Division of General Motors Corp. to join the Marmon-Herrington organization.

WARD LaFRANCE TRUCK DIVISION, GREAT AMERICAN INDUSTRIES, INC., Elmira, N. Y. has appointed W. P. Rice, formerly assistant to the general manager, jeep division, Willys-Overland, general sales manager of the division.

GENERAL DETROIT CORP., Detroit, Mich., has appointed Gail Rutledge director of national accounts and coordinator of branch office activities for the corporation with the title of assistant to the vice president.

LOVEJOY FLEXIBLE COUPLING CO., Chicago, has acquired in entirety the manufacture and sales of the mechanical-power-transmission department of Ideal Industries, Sycamore, Ill. The products that pass to Lovejoy are: Ideal variable speed pulleys, adjustable motor bases, "Select-O-Speed" transmissions, Ideal drive sheaves, and stock of wide V-belts.

HOLUB INDUSTRIES, INC., recently organized by Bert E. Holub, formerly general sales manager of Ideal Industries, Inc., has begun the manufacture of electrical and mechanical products in its new plant at 413 DeKalb Avenue, Sycamore, Ill. Gordon W. Wetzel, formerly Mr. Holub's assistant at Ideal, has terminated his nine years with that company to join the new company as sales manager.

GENERAL ELECTRIC CO., Bridgeport, Conn., has named R. E. Joines, who was recently appointed acting manager of construction materials sales for the Southeastern district, as district manager, with headquarters in Atlanta.

GRAVER TANK & MFG. CO., INC., East Chicago, Ind., has named Edward W. Welp sales manager of water-conditioning equipment. Formerly technical director of Graver's process-equipment division, he has spent 32 years with the firm in every phase of research, design and construction of water-conditioning equipment. Harold C. Connors has been named to head the steel-plate sales, and Harold R. Fosnot water-conditioning equipment sales, in the Chicago district.

R. G. LeTOURNEAU, INC., Peoria, Ill., has received for the second time this year one of the nation's highest industrial advertising honors. On June 23 the National Industrial Advertisers Association named the firm a winner in the Product Advertising Division of its 23rd Annual Conference and Exhibit. Presented at the Association's three-day conference at Atlantic City's Traymore Hotel, the award was received by Eugene E. Weyeneth, advertising manager. The firm was similarly honored April 8 by the Associated Business Papers in the Machinery and Equipment Division of their 4th Annual Business Paper Advertising Competition.

CATERPILLAR TRACTOR CO., Peoria, Ill., has named George T. Lundberg, for the past several years supervisor of transmission design in the engineering department, as assistant to H. S. Eberhard, vice president in charge of manufacturing, engineering, research and training. N. E. Risk will assume supervision of transmission design.

GOODYEAR TIRE & RUBBER CO., Akron, Ohio, has appointed Ian D. Patterson to the newly created post of assistant



IT MAY NOT SEEM TO BE. But every time you use a sledge hammer or any manual tool to unload hopper cars . . . it costs you money! It costs you time! It costs you production! Yes . . . a sledge hammer is a luxury!

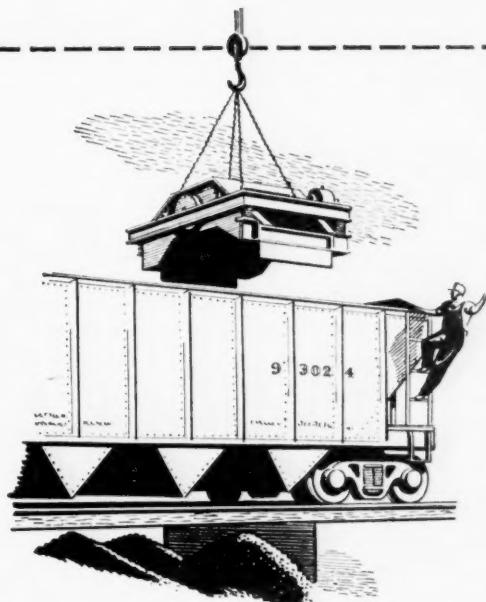
BUT WHEN ROBINS CAR SHAKEOUTS ARE PUT TO WORK—

They do your job *cheaper*. Two men can do the work of six or more men. No expensive installations are needed.

They do your job *faster*. A packed hopper car can be unloaded in minutes—not hours. Cars and locomotives are released sooner.

They do your job *better*. Cars are emptied "broom clean." Neither cars nor loads are injured. Yes . . . you'll find it pays to check with Robins first. The "Job-Engineered" answer to *your* car unloading problem is yours for the asking.

ROBINS CAR SHAKEOUTS



*"Job-Engineered" to Solve Your Problem
CHEAPER . . . FASTER . . . BETTER*

Robins Conveyors Incorporated, Passaic, New Jersey—Division of Hewitt-Robins Incorporated

FOR
BETTER
BRAKE
Performance



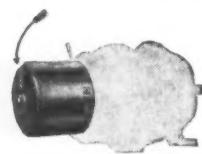
STEARNS
MAGNETIC
offers LARGER
BRAKE for
HEAVIER Loads

A Magnetic Disc Brake that will develop a torque of 575 lbs. or the equivalent of 100 HP at approximately 1000 RPM, now is available in the Stearns 1300 Series. It can be supplied in floor or motor mounting types for AC or DC current.

We can help you solve problems involving effective retarding of motors or machinery, whether for one or a sequence of controlled stops, whether for horizontal or vertical mountings.

Stearns Magnetic Disc Brakes are being used efficiently and satisfactorily by outstanding motor manufacturers and machinery makers in hundreds of exacting operations.

Consult Stearns Magnetic, Milwaukee 4, on your braking problems.



The magnetic brake with the lining wear indicator and manual release—distinctive, original

STEARNS
MAGNETIC Mfg. Co.

661 SO. 28 ST., MILWAUKEE 4

MAGNETIC SEPARATORS
PULLEYS DRUMS CLUTCHES

manager, chemical-product development division. Announcement also has been made that Edward F. Rossiter has been named superintendent of the company's mechanical-goods plant in Sydney, Australia. Robert S. Smiley has been made assistant manager of the company's automotive-products division in Akron.

MANHATTAN RUBBER DIVISION, RAYBESTOS-MANHATTAN, INC., Passaic, N. J. has again received two first awards from the National Advertising Agency Network at its 13th Annual Competition, held recently in Colorado Springs, Colo. These bring to a total of seven the number of first awards received by the division during the past year. The first of these top honors was for "Best Integrated Advertising and Merchandising Campaign", which also was received by Manhattan last year as the initial award under this classification. Another award was for the "Best Business Paper Advertising Campaign", which Manhattan also received for the three consecutive years, 1941, 1942, and 1943.

E. I. du PONT de NEMOURS & CO., INC., Wilmington, Del., has announced the retirement of H. K. Babbitt, production manager of the special products section of the company's explosives department, after 40 years of service with the company. The special products section will be consolidated with the black powder section of the explosives department under the direction of H. C. Peinert, production manager.

ROBINS CONVEYORS, INC., Passaic, N. J., announced plans for the immediate construction of a new large manufacturing building as more than 1,000 employees and guests met on June 25 to celebrate the company's 50th anniversary. Other events on the outdoor anniversary program included tours through the plant, the presentation of a historical memento to Thomas Robins, founder of the company, the awarding of service pins to employees of many years and an outline of expansion plans by President Thomas Robins, Jr.

BECKWITH MACHINERY CO., Pittsburgh, Pa., has appointed Kenneth F. Kichman district manager of the company's Harrisburg Office. Herbert J. Zukanskas, previously associated with the H. K. Porter Co., Inc., has been named public-relations and advertising manager.

BABCOCK & WILCOX TUBE CO. has appointed Joseph T. Ryerson and Son, Inc., steel distributor with warehouses in eleven cities, distributor of B. & W. electric-resistance welded boiler tubes.

ATLAS LUMNITE CEMENT CO. has been merged into the Universal Atlas Cement Co., it has been announced, and will be known as Lumnite Division, Universal Atlas Cement Co., with headquarters at 135 East 42nd St., New York 17, N. Y.

THE OKONITE CO., Passaic, N. J., has appointed Robert K. Spofford, formerly assistant purchasing agent, as purchasing agent to replace George S. Hayes, deceased.

GAR WOOD INDUSTRIES, INC., has named John J. Palmer, a veteran of nearly 40 years in the automobile and allied industries, manager of its Newport News, Va., plant.

UNITED STATES RUBBER CO., New York, N. Y., has announced coordination of industrial-relations activities for the Naugatuck Chemical and Synthetic Rubber divisions under William E. Bradford as service



Make your own adjustable roof jacks by attaching Duff-Norton Fittings to standard pipe cut to the length you need for your operations. You thus eliminate the need for large inventories of roof jacks, reduce costs, assure a dependable stock of roof jacks for all lengths required. Pipe columns and fittings can be used over and over.

Write for details on these cost-cutting Fittings and on the Standard Type Duff-Norton Mine Roof Jack.

**THE DUFF-NORTON
MANUFACTURING CO.**

PITTSBURGH, PA.

There is a Distributor Near Your

KEEP MINING EQUIPMENT

Working Underground...



6 Reasons Why You Should Use the Original Rockbestos A.V.C.

It is made to fit bushings properly.

The impregnated asbestos yarn braid is heatproof, flameproof and resistant to moisture, oil, grease and alkalies.

The felted asbestos insulation beneath, impregnated with heat, flame and moisture resisting compounds like the braid, won't bake out, crack, flow or burn.

Asbestos-protected varnished cambric supplies high dielectric strength and added moisture resistance.

The inner impregnated asbestos insulating wall won't get brittle or crack under conductor-heating overloads and won't burn even if the copper melts.

The paper separator prevents the insulation from sticking to the conductor and makes stripping easy.

This construction is one of 125 developed by Rockbestos for severe operating conditions.

with ROCKBESTOS A.V.C.

You can't afford to let your equipment take *time-out* while depleted stock-piles need building up. Cutters, loaders and locomotives have got to work *overtime* . . . and one sure way to prevent electrical breakdowns and keep them on the job is to failure-proof their internal circuits with Rockbestos A.V.C. Mining Cable.

This tough *asbestos insulated* cable was designed especially for the manufacturers of mining machines more than fifteen years ago when they were looking for a cable that would take the baking heat of resistor grids and overloads, and the rotting action of oil and grease without failing. Mine electricians have standardized on it for rewiring because service records have proved that it stands up under the punishment encountered in mining operations.

Prevent equipment outage . . . increase profit-making tonnage . . . and reduce your electrical maintenance expense by rewiring with Rockbestos A.V.C. Specify it in rebuilt equipment, too. Bulletin 30-C tells the story. Write for your copy and a sample of the cable today . . . or ask one of the nearest distributors below about it.

ROCKBESTOS PRODUCTS CORPORATION
Box 1102, New Haven 4, Conn.



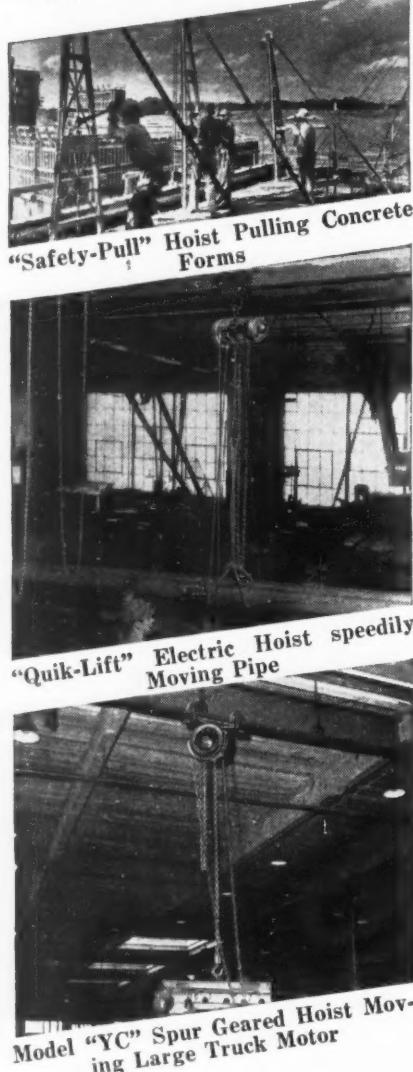
ROCKBESTOS A.V.C. *The Cable with Permanent Insulation*

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.: Beckley Mach. & Elec. Co.	EVANSVILLE, IND.: Evansville Elec. & Mfg. Co.	PITTSBURGH, PA.: Upson-Walton Co.
BIRMINGHAM, ALA.: Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.: Fairmont Supply Co.	Westinghouse Elec. Supply Co.
BLUEFIELD, W. VA.: Superior-Sterling Co.	HUNTINGTON, W. VA.: Banks-Miller Supply Co.	Penn. Elec. Engineering Co.
CHARLESTON, W. VA.: Charleston Elec. Supply Co.	LOTHAIR, KY.: Mine Service Co.	WHEELING, W. VA.: Westinghouse Elec. Supply Co.
CLEVELAND, OHIO: Upson-Walton Co.	MIDDLEBORO, KY.: Rogan & Rogan Co.	WILLIAMSON, W. VA.: Williamson Supply Co.



Wherever COFFING HOISTS are installed there is a noticeable saving in manhours and manpower. New uses are being found daily in all kinds of plants and industry—whether it's production, construction or maintenance.



There is a COFFING HOIST to meet your requirements. Contact your supply house for detailed information or write for our Bulletin Form G4.

COFFING HOIST COMPANY
Danville, Illinois, U. S. A.

manager. Mr. Bradford is a veteran of 32 years service with the company and was previously service manager of the synthetic-rubber plant at Institute, W. Va.

NATIONAL BATTERY CO., Depew, N. Y., has announced details of its new battery laboratory opened earlier this spring. Considered one of the most modern and complete battery laboratories in the industry, the laboratory is used for the preparation and testing of experimental batteries. J. L. Rupp, vice president in charge of engineering, is in charge of laboratory operations and Dr. Eugene Willihnganz heads the research activities.

AMERICAN CAR & FOUNDRY CO., New York, has elected Robert W. Ward, previously district manager of its Huntington, W. Va., plant, a vice president and placed him in charge of manufacturing. Mr. Ward is succeeded as district manager by W. E. Lunger, formerly general superintendent of the Huntington plant. Norman H. Shipley, associated with the company for 34 years, has been named district manager of the Madison, Ill., plant.

A D E L P R E C I S I O N P R O D U C T S C O R P., Burbank, Cal., has appointed Ed. J. Towey, formerly executive vice president of the Diamond Iron Works, Minneapolis, sales manager of its industrial division.

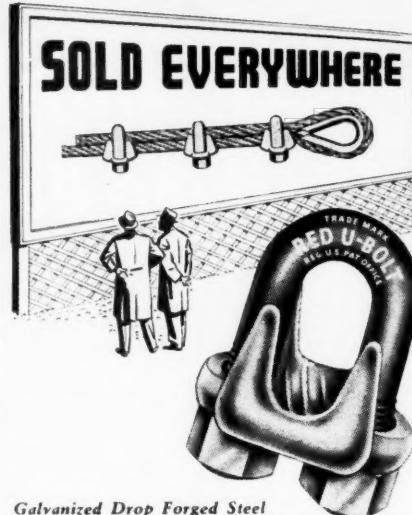
PETTIBONE MULLIKEN CORP. has acquired the Daniels Murtaugh Co., Cedar Rapids, Iowa, manufacturers of heavy-duty dragline buckets ranging from 2- to 10-cu. yd. capacity. J. P. Murtaugh, vice president and general manager of the acquired company, will represent Pettibone Mulliken on the West Coast, and P. V. Larsen formerly sales engineer and secretary of the Murtaugh company, will represent Pettibone Mulliken in the coal industry.

Trade Literature

CENTRIFUGAL PUMPS — Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Catalog No. 7062 illustrates Class GT two-stage centrifugal pumps with cutaway views, types of drive, and typical installations. Tables of performance, dimensions and pipe friction, and a typical pumping problem are included. These pumps are ball-bearing units designed to operate at modern motor, turbine, and engine speeds, available in capacities up to 2200 g.p.m. for discharge heads up to 1050 ft. (450 lb. per square inch).

BRAKE LININGS—United States Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Pa. Catalog No. 646-1 describes Grey-Rock brake linings and clutch facings for industrial equipment such as mine hoists, unloaders, draglines, shovels, dredges, scrapers, concrete mixers, tractors, air compressors, cranes, etc. It contains specific lining recommendations for a wide variety of makes and models of industrial equipment giving number and type of bands used, drum diameter, width, thickness and length of lining, number of pieces of lining used and the Grey-Rock part number.

CHEMICALS AND EXPLOSIVES—Hercules Powder Co., Wilmington, Del. Booklet lists the complete line of Hercules chemicals and industrial explosives, and the more than 50



Galvanized Drop Forged Steel

The better distributors, equipment dealers and hardware stores sell Crosby Clips—America's leading wire rope fastening. A product of American Hoist & Derrick Co., St. Paul.

CROSBY CLIPS

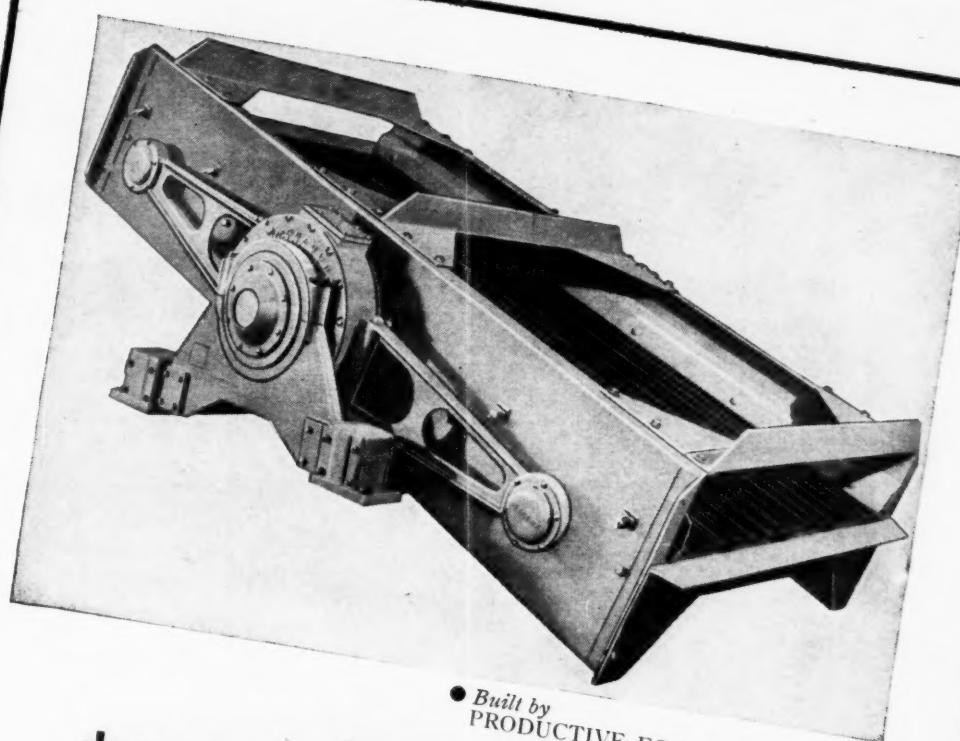


• MARLO ALL PURPOSE METALLIC PACKING
Best ever devised. Will not freeze at 70° below, soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• "TWIN-TWIST"
SEMI-METALLIC PACKING
Metal strands twisted with asbestos. Frictional, Durable, Economical. Anti-compressibility. Never hardens. For temperature up to 550° F.

• "RED WATER"
SEMI-METALLIC PACKING
Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

THE MARLO COMPANY
38 HOWARD ST.
NEW YORK, N. Y., U. S. A.



• Built by
PRODUCTIVE EQUIPMENT CO.

dependable Coal Screening is certain with **SKF** Bearings

There's many a good reason for using this Single Deck Open Type Screening Unit with its quick-change throw: dependable, low-cost coal screening. And there's also a good reason for using **SKF** Spherical Roller Bearings on the "straight-through" drive shaft of this screen. That's the assurance of carrying the entire load year after year without bearing trouble. Pioneered by **SKF**,

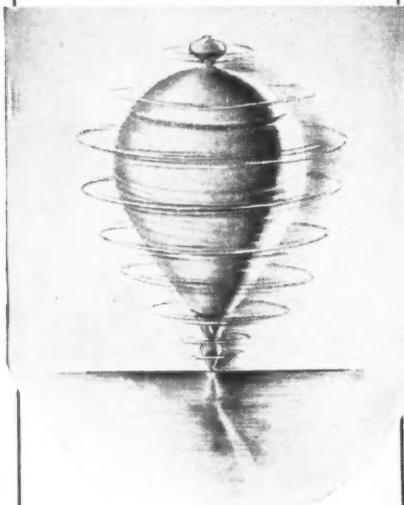
spherical roller bearings have rolling alignment, full load carrying capacity, equalized load distribution—many other advantages that lead to long bearing life under severe service conditions. No matter how tough the job your machine may be called upon to do, make sure its bearings are **SKF**. 6094

SKF INDUSTRIES, INC.
Front St. & Erie Ave., Phila. 34, Pa.



The
"C·M·I"
CONTINUOUS
CENTRIFUGAL

This dryer reduces the moisture content of the finer coal sizes to a point where there is no clogging of spouts, cars, bins, etc., also no freezing in transit or storage.



At many plants this machine is also reclaiming sludge and slurry coal and making a product that is sold for use in powdered coal plants, on chain grate stokers or blended back with some of the larger sizes. Much good carbon that had previously been thrown away is now made into a saleable product.

**CENTRIFUGAL AND
MECHANICAL
INDUSTRIES**

INC.
 3600 SOUTH SECOND STREET
 ST. LOUIS 18, MO.

industries which utilize these products. For easy reference, the products are first indexed according to various industries in which the chemicals and explosives are used and then according to chemical families.

PISTON PUMPS—Warren Steam Pump Co., Inc., Warren, Mass. Bulletin No. 230 on Warren Horizontal Duplex Piston Pumps, Realwear type includes detailed description of the special mechanical features, metal specifications, sizes, capacities, and dimensions. Automatic pumps and receivers also are illustrated and described.

ELECTRODES—Jessop Steel Co., Washington, Pa. Bulletin contains information on the selection and application of Jessop stainless-steel electrodes for welding stainless steel. Current range is furnished for each type of rod in varying diameters.

DIESEL ENGINES—Cummins Engine Co., Inc., Columbus, Ind. Pocket-sized 64-page general catalog provides detailed descriptions of five series of Cummins diesel engines—Series H, Series HS, Series NHS and Series L—covering the power range from 84 to 275 hp. in a wide variety of models.

POWER-TRANSMISSION COUPLINGS—Crocker-Wheeler Division, Joshua Hendy Iron Works, Ampere, N. J. Bulletin SL-1000-1 describes and illustrates the Resilient Flexible Coupling for application on various types of power drives. Chart of recommended applications facilitates selection of proper size.

SILICONE VARNISH—Dow Corning Corp., Midland, Mich. Pamphlet entitled, "How to Use DC 996", is designed primarily for the men who operate rewind and electrical maintenance shops and contains practical instructions on how to apply and cure DC 996 silicone insulating varnish. Also included are tables giving the properties and specifications for DC 996 and a summary of the advantages resulting from use of this new Dow Corning silicone varnish for impregnating electrical machinery.

AERIAL CABLE—Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass. Data sheets Nos. 116 and 117 illustrate and describe properties and applications of Simplex aerial cables and self-supporting aerial cables respectively.

GRADER—Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis. Catalog No. MS-300A features the newly improved AD motor grader, stressing the capacity, performance and design. A specification sheet lists data concerning weights, its six forward speeds from 1.5 to 16.6 m.p.h., lifting mechanisms, tire sizes, fuel capacities and engine dimensions.

CENTRIFUGAL PUMPS—Economy Pumps, Inc., Hamilton, Ohio. Bulletin No. B-346 illustrates the Economy vertically split-case, multi-stage, high-pressure centrifugal pumps, which are usually directly connected to electric motors, but also may be driven with small steam turbines, gasoline engines or chain- or belt-drive arrangements. These pumps can handle liquids up to 200 lb. per square inch and capacities from 10 to 75 g.p.m.

TUBING—Pratt Industries, Inc., Frank-

**FOR SAFETY'S SAKE,
SUPERIOR COUPLINGS**



Drop Forged Links

Drop forged or strength, Superior Sivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on our mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

**DROP FORGED SWIVEL
COUPLINGS**



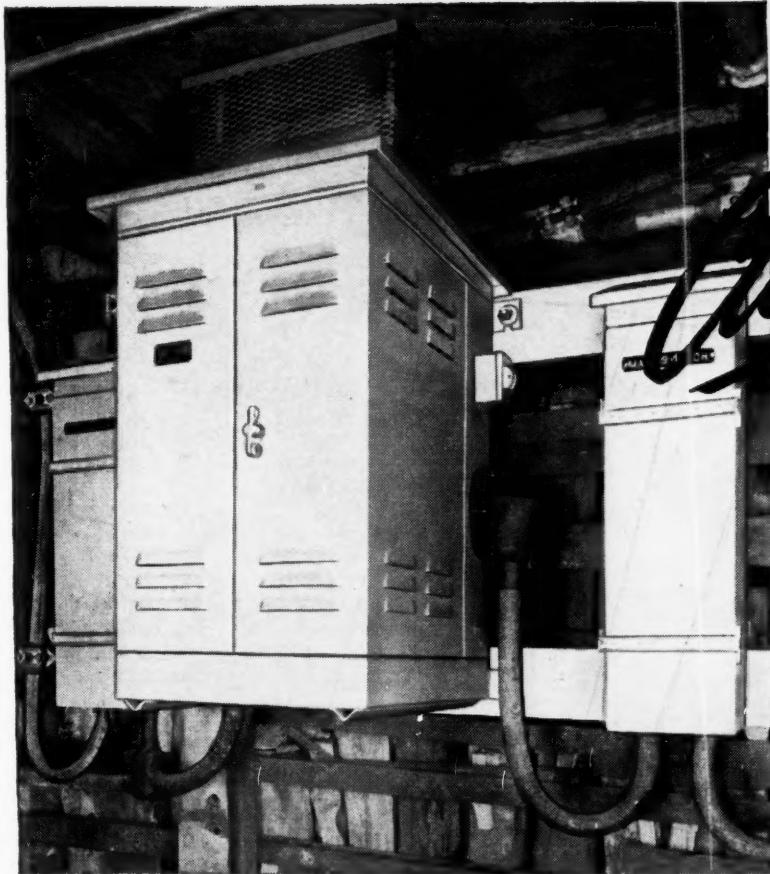
**PITTSBURGH
KNIFE & FORGE CO.**

1421 Reedsdale St., N.S.
 Pittsburgh 12, Pa.

IT'S COOL HERE



AIR-CONDITIONED



Added Safety

WITHOUT ADDED COST

Safety is really a bonus with I-T-E Sectionalizing Circuit Breakers. Their use means increased production, more economical utilization of power, less maintenance and repair for electrical equipment. These advantages effect savings—defray the cost of the installation. Safety, therefore, is obtained with no added cost.

Operating on circuits which may be fed from either direction, I-T-E Sectionalizing Circuit Breakers are extremely sensitive—separate substations quickly, when overloads and shorts occur. Unattended, they

automatically open when currents become excessive and reclose when conditions return to normal.

No longer need electrical disturbances on underground distribution systems be the chief cause of mine fires. And with safety so important, it's nice to receive as a bonus and not as an added expense.

Bulletin 2503 completely describes and illustrates this equipment. Write for your copy, today. The I-T-E Circuit Breaker Company, 19th & Hamilton Streets, Philadelphia 30, Pa.

I-T-E SECTIONALIZING SWITCHGEAR 

fort, N. Y. Booklet describes and illustrates spirally formed lightweight tubing used in mine-ventilating systems, pulverized coal circulating lines, as concrete-pillar forms, etc. Tables and test illustrations compare the product for weight and strength with other types of material commonly used for the same purposes.

HOISTS, CAR PULLERS, ETC.—American Hoist & Derrick Co., St. Paul 1, Minn.—General catalog lists and illustrates the company's complete line of products, including, among others, hoists, car pullers, derricks and cranes.

GRAPPLER DEVICES—Hayward Co., 50 Church St., New York 7, N. Y. Bulletin No. 802 outlines the various Hayward grapple devices for handling such materials as rock, scrap iron, trash, etc.

STEEL—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill. Issue No. 18 of the Ryerson Steel Pictorial illustrates with many striking photographs the diversified uses of steel throughout many industries.

HEATING EQUIPMENT—L. J. Wing Mfg. Co., 154 West 14 St., New York 11, N. Y. Folder lists unit heaters, ventilating fans,

blowers and other products manufactured.

ELECTRIC TOOLS—Ideal Industries Inc., 1296 Park Ave., Sycamore, Ill. Catalog provides complete details of electric hand tools, accessories, machine-tool attachments, dust collectors and other products available.

PIPE JOINTS—Dresser Mfg. Co., Bradford, Pa. Folder illustrates and describes Bellmaster Style 85 joints for cast-iron-pipe joining. Construction, advantages and specifications are included.

BLUEPRINT MACHINES—Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41, Ill. Individual folders describe the Bruning Model No. 158 developer and Model No. 40 BW printer.

INTERVAL TIMER—Electronic Controls Inc., 44 Summer Ave., Newark 4, N. J. Bulletin describes Model No. 1029 electronic timer used in applications requiring accurate circuit timing from 1 to 120 sec., in intervals of 1 sec.

POWER-TRANSMISSION COUPLING—American Flexible Coupling Co., Erie, Pa. Catalog lists the complete line of American and Amerigear flexible couplings and includes full information on design, specifications and applications for each of several series.

BELTING—B. F. Goodrich Co., Akron, Ohio. Folder pictures and describes power-transmission belting for drives of any size and includes flat and V-beling for various services, as well as sheaves, belt dressings and the Plyrock method of making flat transmission belts endless on the job.

ELECTRODES—Air Reduction Sales Co., 60 East 42 St., New York, N. Y. Electrode-selection wall chart specifies which electrode to use on a particular job, shows currents, and includes mechanical properties and an electrode color guide showing them in their actual colors. Electrodes covered include those for mild, alloy and stainless steels, as well as for non-ferrous, cast-iron and hard-facing rods.

DRILLS—Keystone Driller Co., Beaver Falls, Pa. Bulletin illustrates and describes the Keystone Model 51 blast-hole drill and includes complete information on construction, performance and design. Full specifications also are listed for this crawler-mounted drill.

FLOOR TREATMENT—Truscon Laboratories, Detroit 11, Mich. Specification Book B covers floor treatments for concrete and wood floors, describing "integral" hardeners, chemical hardeners, concrete dye, surface coatings and wood-floor preservatives.

ELECTRODES—Metal & Thermit Corp., 120 Broadway, New York 5, N. Y. Catalog illustrates and describes applications, characteristics, physical and chemical properties and recommended welding procedures for over 40 Murex arc-welding electrodes for a.c. and d.c. welding of mild steels, low-alloy steels, bronzes and cast iron, as well for hard surfacing, automatic welding, and underwater cutting and welding work. A new line of basic welding accessories has also been included. An engineering-data section provides helpful information for planning and estimating welding job costs.

PROFESSIONAL SERVICES

ALLEN & GARCIA CO.

ENGINEERS AND BUILDERS OF
MODERN COAL OPERATION

Authoritative Valuations, and Reports of
Mining Properties, Equipment and Opera-
tion.
332 S. Michigan Ave., Chicago
120 Wall Street, New York, N. Y.

HERBERT S. LITTLEWOOD

CONSULTING ENGINEER

Application - Supervision of Installation
Maintenance - Inspection - Testing
POWER-HAULAGE-HOISTING-VENTILATION
211 Carnegie Place Pittsburgh 8, Pa.

JOSEPH M. BRAY, PhD

Mining Engineer — Geologist

Examinations, Valuations, Reports
Mining, Preparation, Rock & Earth Work
Telephone 2791
Hazleton Nat'l Bank Bldg., Hazleton, Penna.

McNEIL & McNEIL

Engineers

179 W. Washington St. Chicago 2

BURRILL and GWIN

Power Plant and Transmission Lines
Mine Ventilation, Haulage and Drainage Systems
Sewage Disposal and Water Supply
Industrial Plants, Surveys, Reports
Baltimore, Md. Altoona, Pa.

C. C. MORFIT & ASSOCIATES

Consulting Engineers
Reports, Valuation, Construction,
Operation, Management
11 Broadway, New York 4, N. Y.

F. CARL COLCORD

Consulting Engineer
COAL LAND VALUATIONS
MINE INSTALLATION AND
OPERATION

1132 Union Trust Bldg.
Cincinnati, Ohio
Phone Cherry 5403

SHERWIN and JANVRIN

Mining Engineers

Pineville, Ky.
Reports on COAL PROPERTIES
Planning, Construction & Supervision

EAVENSON & AUCHMUTY

Mining Engineers
Coal Operation Consultants
Valuation
2720 Koppers Bldg. Pittsburgh 19, Pa.

TEMPLETON-MATTHEWS CORPORATION

Designing Engineers—Consultants—Builders
"Practical Application of Skilled Engineering to your Coal Preparation Problems."
1005 Sycamore Bldg. Terre Haute, Indiana
Crawford 7051

J. H. FLETCHER

30 Years
Continuous Consulting Service
to Coal Mines
Telephone Harrison 5151
McCormick Building Chicago, Illinois

L. E. YOUNG

Consulting Engineers
MINE MECHANIZATION
MINE MANAGEMENT
Oliver Building—Pittsburgh, Pa.

T. W. GUY

COAL PREPARATION

To Yield Maximum Net Return
Face and Product Studies
Plant Design and Operation
Coal Sampling
Kanawha V. Bldg. Charleston, W. Va.

Consulting engineers

can save you money — by
saving TIME . . . never
more important than it is
today!

Wire rope "architect" at work ... for YOU!



To give the finished product maximum service, safety and economy, Macwhyte Wire Rope is carefully blueprinted by "architects" before any actual manufacturing starts. These men are Macwhyte's highly skilled design engineers.

Such things as size and quality of wires and strands, degree of flexibility, bearing surface, core, etc., must be accurately de-

termined. The engineer's calculations must be perfect to produce a rope in which all parts fit uniformly and work together as a team to best meet operating conditions.

Proper designing is just one example of the thoroughness Macwhyte exercises at every step in planning and producing wire rope. No effort is spared to make it the correct rope for your equipment.

Make Macwhyte your headquarters for Wire Rope and Slings

MACWHYTE WIRE ROPE

MACWHYTE COMPANY, 2931 Fourteenth Ave., Kenosha, Wisconsin

Mill Depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle
San Francisco • Los Angeles • Distributors throughout the U. S. A. and other countries

★ ★ ★ ★

MACWHYTE PREformed and Non-PREformed Wire Ropes

— Internally Lubricated . . . MONARCH WHYTE STRAND

Wire Rope . . . Special Traction Elevator Rope . . . Braided Wire

Rope Slings . . . Aircraft Cables, Assemblies and Tie-Rods . . . Stainless

Steel Wire Rope, Monel Metal Wire Rope,

Galvanized Wire Rope.

Ask for Macwhyte
Wire Rope Catalog G-15

Contains 170 pages of valuable information; lists Macwhyte's complete line. Ask any Macwhyte representative or write Macwhyte Company.





PROTECTS *your* EQUIPMENT

PROMOTES SAFETY



ENTIRELY *Automatic* . . . P-G Automatic Transfer

Switches are designed for use on all types and makes of gathering locomotives.

Automatically transfers the current from trolley to reel, or vice-versa. Hand operated switches are eliminated.

Promotes safety—avoid shocks or burns to operator while changing from trolley to reel.

Simple in design, easy to install, requires very little space, and can be mounted anywhere. Furnished complete with cover.

Heavy duty coils provide for positive contact through double contact assembly. Contacts are easily renewable.



THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

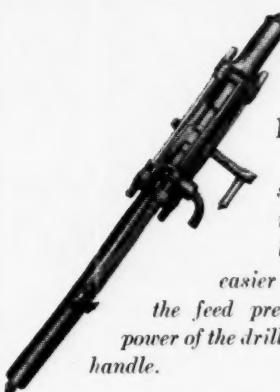
221 WEST THIRD STREET, CINCINNATI 2, OHIO

"TONNAGE TOOLS"

by GARDNER DENVER



It weighs only 31 pounds, but this Gardner-Denver S33 Drill is fast and powerful. It's a quality tool—with four-pawl rotation—instead of the two-pawl so generally used in drills of this weight class.



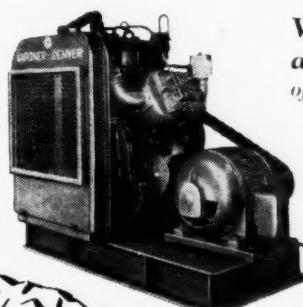
In the Gardner-Denver R104 Stopper, the stinger never feels light—the nose always stays up. This better physical balance means easier handling. In the R104, too, the feed pressure is balanced with the power of the drill itself. No pull on the holding handle.



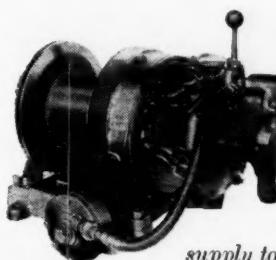
Weighing 55 pounds, the Gardner-Denver S55 Drill is the fastest heavy-duty drill of its class on the market—by actual test. Balanced performance—greater drilling capacity with easy riding and conservative air consumption.



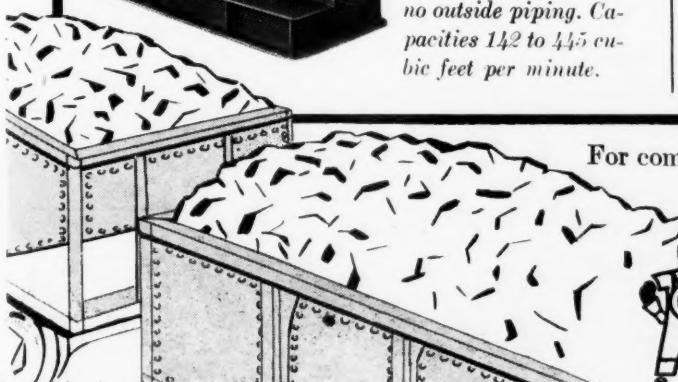
It's easy on the set-up—amazingly free from vibration—and automatic in action! The Gardner-Denver CF89H Drifter actually regulates the speed of its own feed in accordance with the type of ground being drilled. No frequent manual adjustments.



Want a dependable, low-cost source of air power? Then insist on a Gardner-Denver WB Vertical Water-cooled Compressor. This model takes but little space—requires no outside piping. Capacities 142 to 445 cubic feet per minute.



There's real safety for the load—and for the operator—in this Gardner-Denver HKK Safety Hoist! The automatic brake of this hoist is instantly applied if the air supply to the motor is interrupted for any reason! Greatest vertical lift at 80 pounds air pressure—2000 pounds.

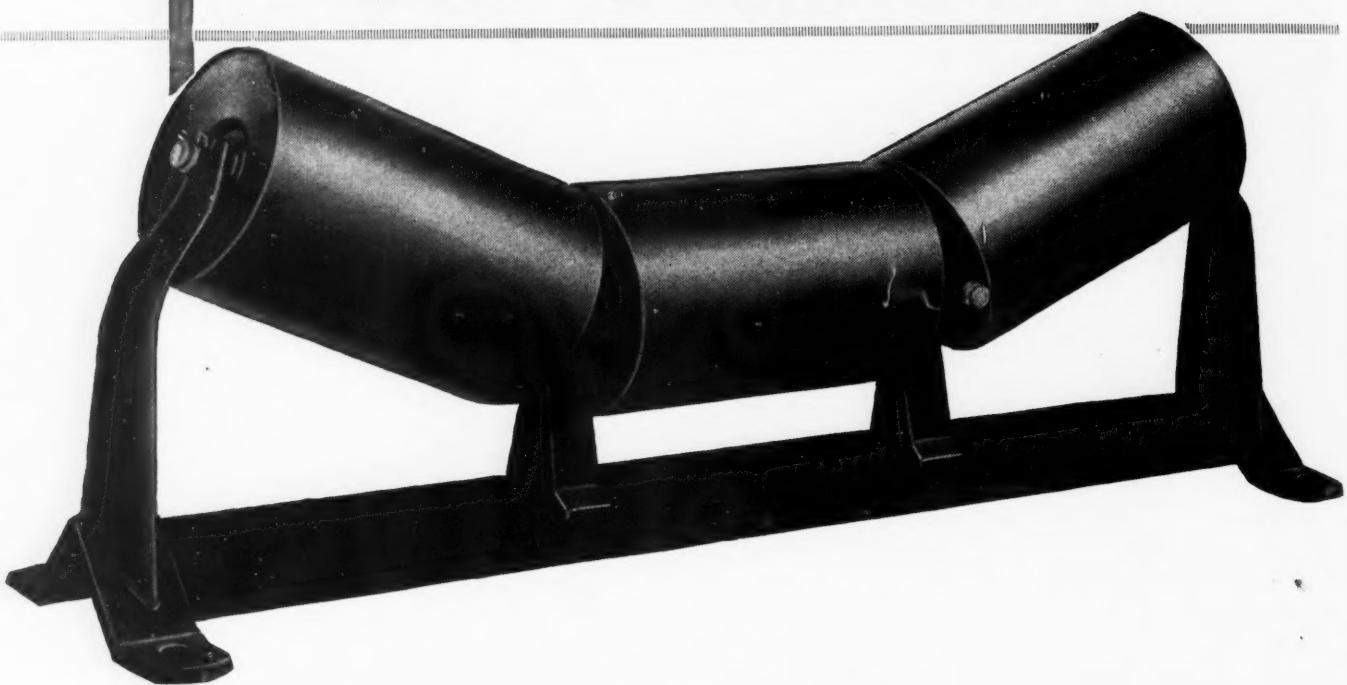


For complete information, write Gardner-Denver Company, Quincy, Illinois



GARDNER-DENVER
Since 1859

FOR MEN...



who are looking ahead...

• B-G Belt Carriers enable many operators to look ahead toward long years of low-cost material-moving service. Skillfully welded, practically unbreakable, they roll on bearings that are sealed to keep grease in—dust out. Their maintenance demands are next to nothing.

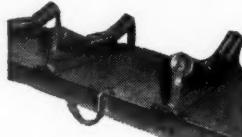
They are equally preferred among fore-

sighted plant superintendents for replacing wornout carriers—and for use in modernizing entire materials-handling operations. Belt widths 16" to 48", in various types. For information on Barber-Greene Belt Conveying Equipment, see your B-G representative. Barber-Greene Company, Aurora, Illinois.



TRUSS FRAME

Standardized units, rigidly constructed, factory aligned, for easy assembly on the job. 12", 24" and 42" depths.



CHANNEL FRAMES

Simple, self-contained units quickly erected—available in 8 and 9 foot lengths.



DRIVES—TAKE-UPS—
ACCESSORIES

Wide variety of pre-engineered units to meet particular requirements. Each unit complete, ready for installation.



Barber-Greene

CONSTANT FLOW EQUIPMENT



LOADERS



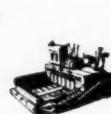
PERMANENT CONVEYORS



DITCHERS



PORTABLE CONVEYORS



FINISHERS



BITUMINOUS PLANTS



COAL MACHINES

"ROCK BOTTOM"

Digging Costs

Assured
with
BUCKEYE
CONVERTIBLE
SHOVELS



Buckeye $\frac{1}{2}$ and $\frac{3}{4}$ yard shovels cut digging costs to "rock bottom" in any material by making digging, dumping, swinging, and traveling, easier and faster, with metered *vacuum power control*. Instant response to slight movement of short handles conveniently grouped on control panel assures fast action with full "feel". Simultaneous swing, crowd hoist and travel, plus vacuum control dipper trip speeds up every operation. Elimination of the fatigue caused by tugging at cumbersome levers means your operator can turn out as much work in the last two hours of the shift as in the first two.

Coupled with ease and speed of operation is

rugged construction to withstand the shocks and stresses of the toughest kind of stripping. Heavy duty, twin member, steel boom; strong tubular dipper stick; rugged chain crowd are only a few of the many superior construction features that make Buckeyes stand up under the most severe coal stripping and loading conditions.

Get full details *now* on these speedy, convertible shovels that cut material handling costs to "rock bottom".

BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO



"TOMORROW'S WAY IS YOURS TODAY"

Buckeye

CONVERTIBLE SHOVELS—BULLDOZERS—ROAD WIDENERS—TRENCHERS—MATERIAL SPREADERS—R-B FINEGRADERS



After 12 years...

**This Mine Drainage Pipe
still meets the "acid test"!**



ANOTHER TESTIMONIAL to the economy of Transite Pipe in coal mine service is this installation, made in the Coal Brook Colliery at Carbondale, Pa., in 1934.

Today, after 12 years of handling corrosive mine water, the pipe is still in use and in good condition. In fact, so well has Transite met the "acid test" here, that the owners of this property, the Hudson Coal Company, now have nearly 30,000 feet in use in their various mines.

Many producers have had similar experience with this tough, corrosion-resistant, asbestos-cement pipe...are now able to measure the serv-

ice life of their drainage pipe lines in years instead of in months!

In addition to its ability to resist corrosion, Transite is easily and economically installed. The Simplex Couplings form tight, yet flexible joints which permit laying the pipe around curves without special fittings. Two men can easily assemble this pipe in the sizes generally used, even in restricted mine passages.

For full details about Transite Pipe for mine drainage, water supply, and other services, write Johns-Manville, Box 290, New York 16, New York.



Johns-Manville TRANSITE PIPE FOR COAL
MINE SERVICE

YOU GAIN 6 BENEFITS

with Willison Automatic Couplers



You'll produce faster and safer, at lower cost, by equipping your mine cars with Willison Automatic Couplers, which give you these six advantages:

- Safer operation—coupling and uncoupling without going between cars
- Faster handling of large capacity cars
- Faster shunting and gathering
- Less coal spillage
- Operation around sharp curves
- No uncoupling on rotary dumps.

We'll gladly work with you or your car builders to give you these advantages of safety, speed and lower costs.



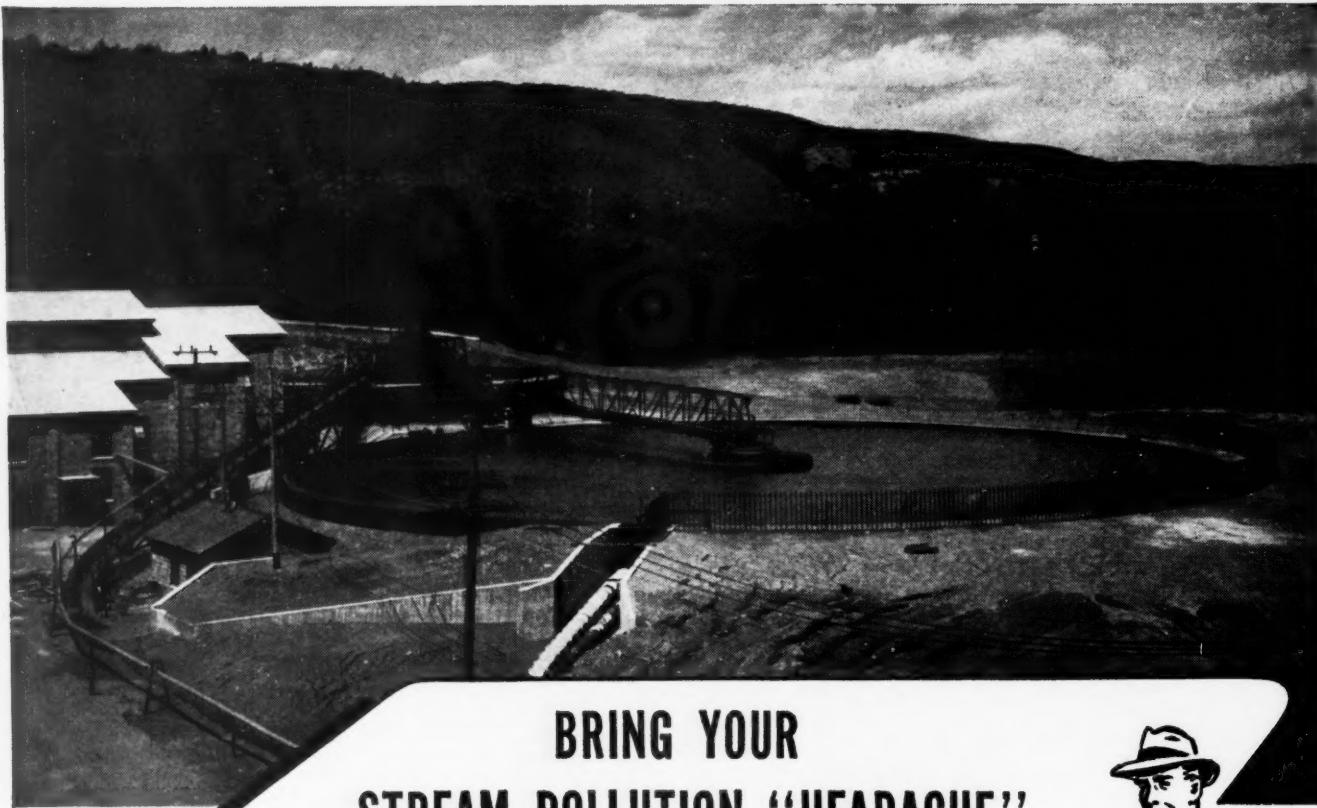
NATIONAL

MALLEABLE AND STEEL CASTINGS CO.

Cleveland, Ohio

Sales Offices: Cleveland, Chicago, New York, Philadelphia, Richmond, St. Louis, San Francisco.

Works: Cleveland, Chicago, Indianapolis, Melrose Park, Ill., Sharon, Pa.



BRING YOUR
STREAM POLLUTION "HEADACHE"
TO A **DORR** SPECIALIST!

DORR engineers have solved the problem of stream pollution for some fifty plants. *Fifty times* coal operators have called in Dorr engineers to discuss problems of difficult installation . . . *Fifty times* Dorr engineers came up with the correct answer . . . a simple, satisfactory solution which prevented stream pollution and kept operating costs to a minimum.

There is no secret to the success of Dorr engineers. After years of experience, they *know* the complete Dorr line of equipment and how it can be fitted economically to specific plants. They *know* the local rules and regulations through continual and intimate contact, and — most important — how to meet them.

Why not shift your stream pollution worries to Dorr engineers? Take advantage of their experience — give them your "headaches" to clear up. Further, the Dorr Company is prepared to furnish a *complete* service that works, in complete cooperation with your plant engineering staff, without production interruption.

Upon request, a DORR engineer will visit your plant, study conditions and then make recommendations for equipment designed to meet your particular requirements.

DORR
RESEARCH ■ ENGINEERING ■ EQUIPMENT

ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE



© 1946



THE DORR COMPANY, ENGINEERS

NEW YORK 22, N. Y. . . . 570 Lexington Ave.
ATLANTA 3, GA. . . . WILLIAM-OLIVER BLDG.
TORONTO 1, ONT. . . . 80 Richmond St. W.
CHICAGO 1, ILL. . . . 221 NO. LA SALLE ST.
DENVER 2, COLO. . . . COOPER BUILDING
LOS ANGELES 14, CAL. . . . 811 WEST 7TH ST.

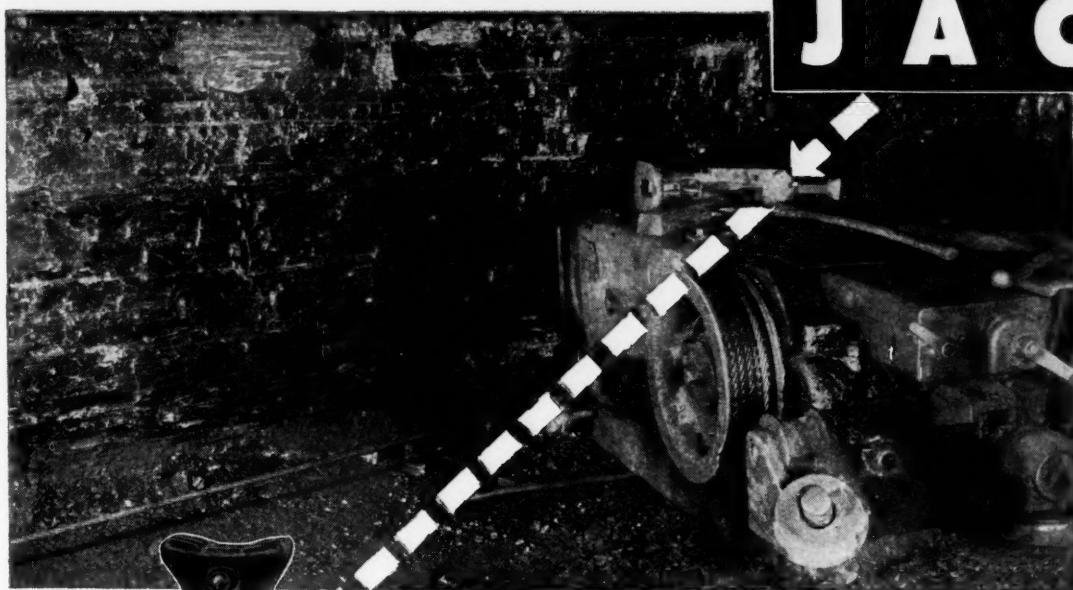
RESEARCH AND TESTING LABORATORIES
WESTPORT, CONN.

SUGAR PROCESSING

PETREE & DORR DIVISION
570 Lexington Ave., New York 22, N. Y.

**THIN SEAMS CALL
FOR SIMPLEX**

**NO. 84A
JACKS**



No. 84A, (5-tons)
for thin seams.
Height 14", lift 7".

This low height Simplex General Purpose Mine Jack is made for working thin seam coal. It speeds the moving and adjustment of coal cutting machines, conveyors and loaders; re-railing mine cars and light locomotives; track work, etc. The Simplex No. 84A is easy to handle and use in cramped quarters — being but 14 inches in height and weighing only 28 lbs.

For working medium seams, No. 85A and 1017, and for thick seams, No. 86A, are the accepted Jacks wherever coal is mined underground.

The Simplex No. 185 is a versatile Mine Jack, supplied with an adjustable drop forged auxiliary cap shoe which provides four adjustments. Loads can be readily lifted at a right angle to the operator on the auxiliary shoe.

These 5 and 10 ton Simplex Jacks are speedy, rugged and — above all — safe. Maximum safety is assured by such features as double lever sockets, stronger cadmium plated springs and links, shorter fulcrum centers, longer and wider concave rack bar toe lifts, larger trunnion bearings, stronger pawls and reinforced inner-ribbed housings.

Every one of your mining machines should carry a Simplex Jack — many are furnished as standard equipment — be sure you properly equip the balance. Send for new bulletin — Mines-46.

No. 85A, (5-tons)
for medium seams.
Height 17",
lift 10".



No. 86A, (5-tons)
for thick seams.
Height 20", lift 13".



No. 185, (5-tons), Height
17", lift 10". Lifts at right
angle to operator on aux-
iliary shoe.

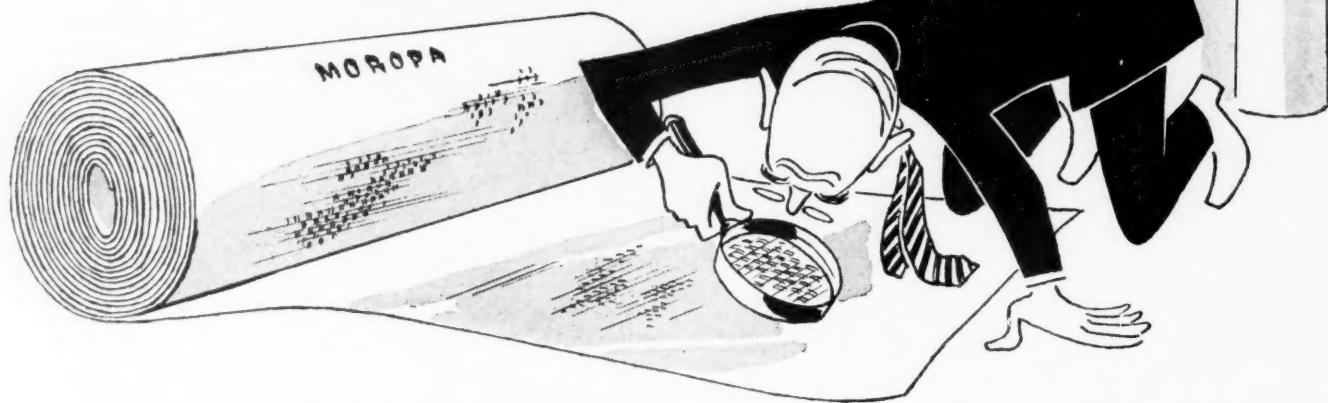


No. 1017, (10-
tons) for me-
dium seams.
Height 17",
lift 9 1/2".



TEMPLETON, KENLY & CO., CHICAGO 44, ILLINOIS

He still can't figure out why
MOROPA DRY JUTE BRATTICE
 outwears them all



As anyone knows who has made comparative tests, Moropa Dry-Treated Jute Brattice outlasts ordinary brattice cloths every time. The reason is simple: Moropa Brattice is carefully treated in an exclusive process which impregnates every fiber of the cloth with fire-resistant and mildew-repellent properties.

Priced no higher than other brattice cloths, the famous Moropa definitely lasts longer, gives better service, cuts costs, is easier to handle, comes in all

standard widths and weights. There's no wonder that Moropa is preferred by leading operators. For samples and further information, write us today.

Manufactured and Distributed Only by

John Flocker and Company

644 GRANT STREET • PITTSBURGH 30, PA.

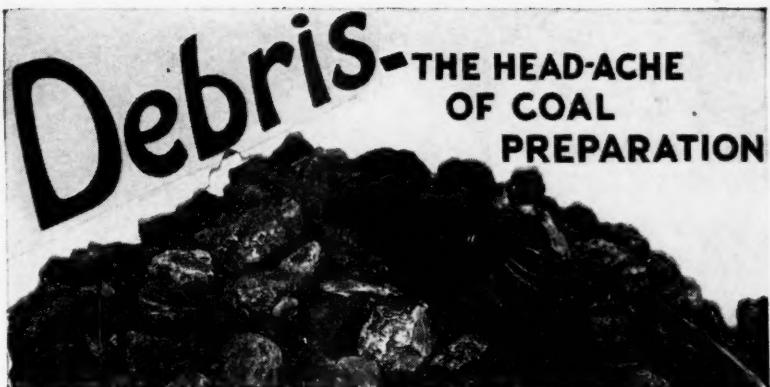
Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope



Parmanco
 MECHANICAL FEED
 HORIZONTAL DRILL.

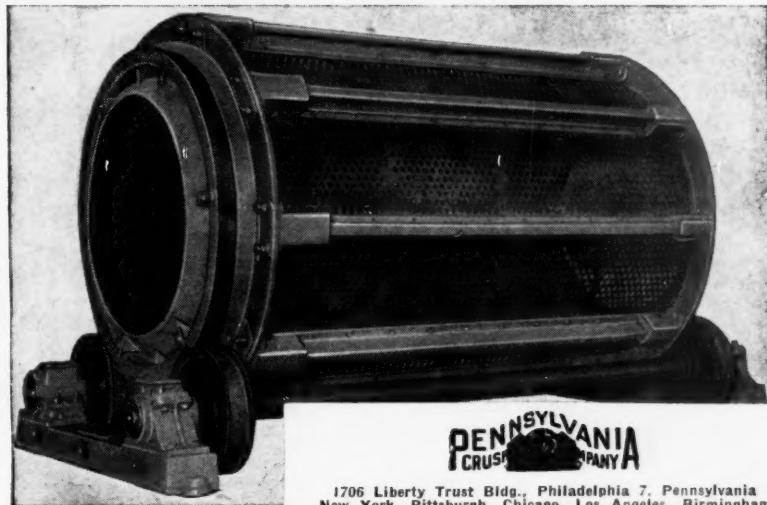
Heat-treated gears are used in this transmission and spur gear reductions, with an ample factor of safety for the operation of machine under all conditions. Link-Belt bearings of extra size are used throughout. Augers are connected to main drive shaft through a self-aligning chuck of ample size, in which is secured the drive shaft by two shear pins which provide sufficient safety to rest of machine. The machine is raised or lowered to a height of 36 inches by jacks on front of machine, and rear of machine is mounted on two pneumatic-tired wheels which also have a 36-inch range of adjustments. The machine permits the drilling of a controlled-angle hole, which makes possible a great saving in the use of explosives through the cantilever effect of this controlled-angle drilled hole.

PARIS MANUFACTURING COMPANY
 PARIS, ILLINOIS



Removed by
**The "Pennsylvania"
 Bradford Breaker**
 Here are the
Four Important Jobs It Does

1. Takes Shovel-loaded full seam mined Bituminous coal, and automatically removes Big Rock, Tramp Iron, and Mine Refuse.
2. Automatically Trims Good Coal from Binder.
3. Delivers products 100% to the sizes required for Cleaning.
4. Eliminates Picking and Scalping Operations, — and requires Minimum Power and Maintenance.

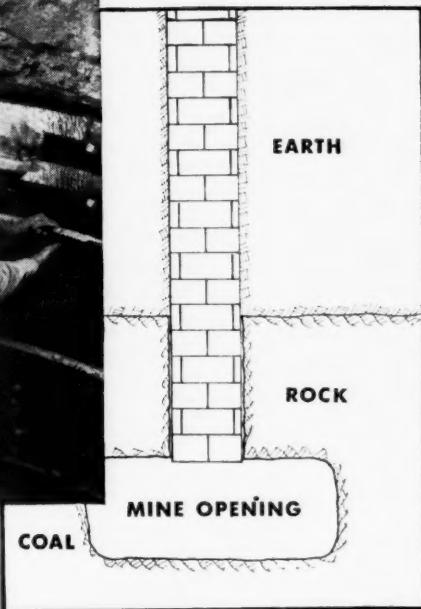


MASSIVE STEELBUILT CONSTRUCTION

Capacity Range 50 to 1500 Tons Hourly

At your suggestion, our Field Engineer will be glad to observe and report your requirements, as a basis for our recommendations.

**BUILD VERTICAL OR SLOPED OPENINGS
 THIS SIMPLE, SPEEDY WAY**



Air shafts and escape-ways are built quickly and economically with ARMCO Tunnel Liner Plates.

Here's an easy, economical way to provide ventilation and safety as active workings extend from original mine openings. Simply use ARMCO Tunnel Liner Plates to sink new shafts.

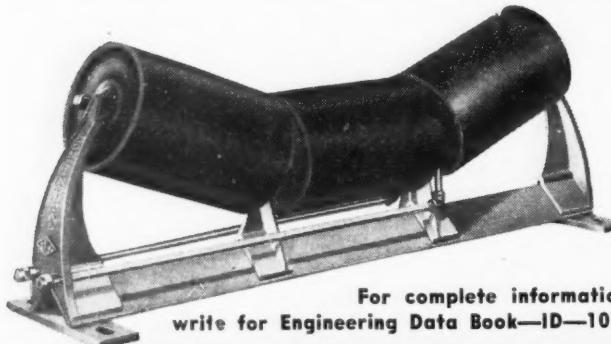
These plates are amply strong and provide worthwhile durability and safety from fire hazards. One man easily handles the lightweight steel sections, bolting them together with regular wrenches. Costs are low and the job is speeded.

You'll find ARMCO Tunnel Liner Plates ideal for sloped entries, air shafts, escape-ways, substations and overcasts. Write for data on ARMCO Tunneling methods. Armco Drainage & Metal Products, Inc., and Associated Companies, Middletown, Ohio.

• • • • **ARMCO TUNNEL LINER PLATES** • • • •



**CONTINENTAL IDLERS
SURE CUT HAULAGE
COSTS AT OUR MINES**



For complete information
write for Engineering Data Book—ID—105.

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

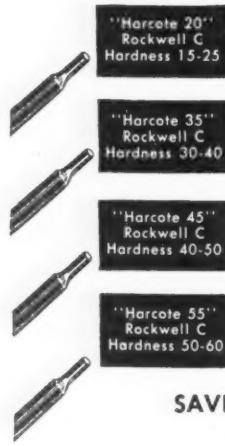
BIRMINGHAM, ALABAMA



ATLANTA • DALLAS • MEMPHIS



NOW! **P&H**
Hard-Facing
Electrodes To Match Desired
Rockwell "C" Hardness



P&H now makes hard surfacing a simpler, easier job — easier in the selection of the correct electrode . . . easier to get the desired as-welded hardness.

These four new P&H "Harcote" Electrodes do it! For now Harcote is available in a type having the exact degree of Rockwell C hardness for the job. If the job calls for a Rockwell C hardness of 55 — just order and use Harcote "55". That's all there is to it! No guesswork—no confusion. Simply specify "Harcote" according to the corresponding number of Rockwell "C" hardness desired.

SAVE TIME — SAVE EQUIPMENT
— USE P&H HARCO

Call Your P&H Representative or write for complete information on Harcote. A complete line of other P&H electrodes is also available.

P&H

HARNISCHFEGER
CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS • ELECTRIC CABLES • AIR WELDING • EXCAVATORS

General Offices:
4540 W. National
Avenue,
Milwaukee 14, Wis.

IMPROVED SUTTON SAND DRYING STOVE

The same time tested principle for drying sand as used in Sutton STANDARD Sand Drying Stoves for more than forty years is employed in the No. 0 Sutton IMPROVED Sand Dryer.

NEW FEATURES

- PERFORATED RING of an entirely new design.
- A FIRE BOWL added between the grate and perforated ring. New type FIRE GRATE.
- ASH PIT DOOR EXTENSION to protect clean sand from ashes.
- 3/16" STEEL PERFORATED SKIRTING with clean out Doors.



ECONOMY FLAME SPREADER in dome.
Catalog and Prices sent upon request.

INDIANA FOUNDRY COMPANY

950 Oak Street, Indiana, Pa.



Keep your conveyor
belts going with

FLEXCO

HD BELT FASTENERS



• **FLEXCO HD RIP PLATES** are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.



• Avoid shutdowns and lengthen the life of your conveyor belts and bucket elevator belts by using Flexco HD belt fasteners and rip plates. Thousands of companies have stepped up the performance of conveyor lines and cut costs by using Flexco methods.



• **FLEXCO HD BELT FASTENERS** make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent pry separation. Six sizes in steel and alloys.

FLEXIBLE STEEL LACING COMPANY
4638 Lexington St., Chicago 44, Illinois



Write for
your copy

FLEXCO

HD BELT FASTENERS

Sold by supply houses everywhere

UNIT 514

Speeds Up Coal Handling!

Fast operating crawler type crane . . . maneuvers easily . . . combines LIFT ability, plus stability. Famous UNIT one-piece cast gear case . . . disc type clutches . . . automatic traction brakes. Low initial cost and low upkeep. Fully convertible. Write for literature.



UNIT CRANE & SHOVEL CORP., Milwaukee 14, Wis., U.S.A.

A 4829-1/4R



THE combined research, production and distributing facilities of three famous companies are now offered to American industry by The Colorado Fuel and Iron Corporation. Thus, a new nation-wide service is made available in steel, wire products, and allied specialties under the trade-marks of Wickwire Spencer, Calwico, and CF&I—each a standard of industrial progress in its own right.

The East and Middle West will continue to be served by Wickwire Spencer Steel Division. The Colorado Fuel and Iron Corporation will serve the Plains and Mountain States with CF&I facilities as before plus the products of the eastern and western divisions. The California Wire Cloth Corporation (a subsidiary) will supply its own products and in addition the products of the other two divisions to Pacific Coast customers.

The well-earned reputation for quality which these three companies have enjoyed will be maintained in the new and greater Colorado Fuel and Iron Corporation.

WICKWIRE SPENCER STEEL DIVISION 
The Colorado Fuel and Iron Corporation 

THE CALIFORNIA WIRE CLOTH CORPORATION

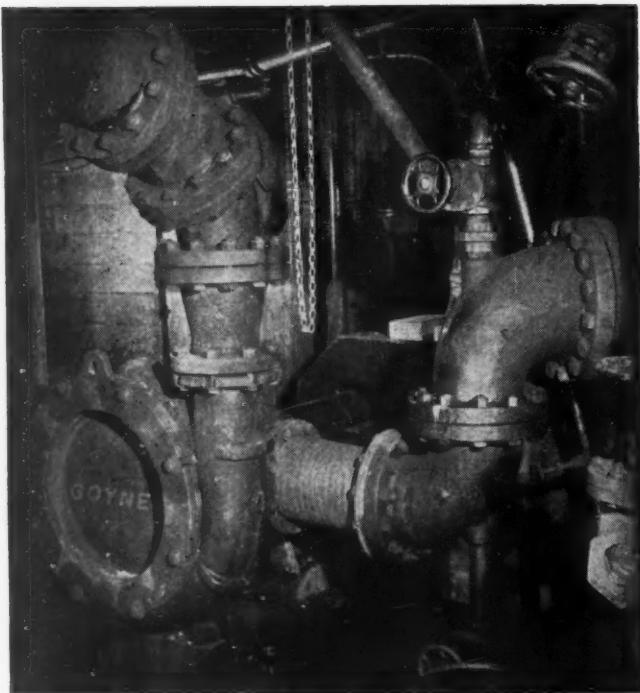
EASTERN SALES OFFICES
500 PARK AVENUE, NEW YORK, N.Y.

EXECUTIVE OFFICES
DENVER, COLORADO

WEST COAST OFFICES
OAKLAND, CALIFORNIA

KEY CITY OFFICES
SEE PHONE BOOK

GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne.

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.
2. The one packing box of the pump subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.
3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.
4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.
5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

*All inquiries receive prompt
and careful attention.*

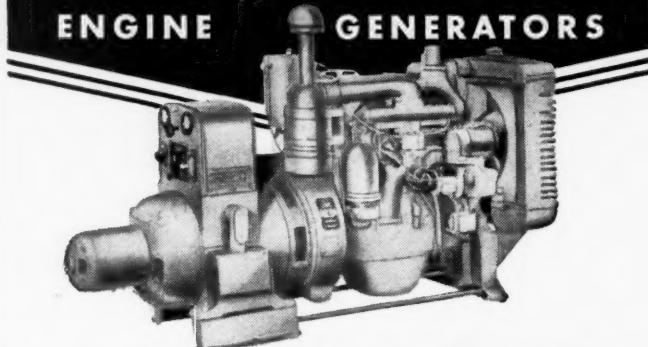
THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

Makes Electric Power Available Anywhere!

Low Cost Electricity with

READY-POWER

ENGINE GENERATORS

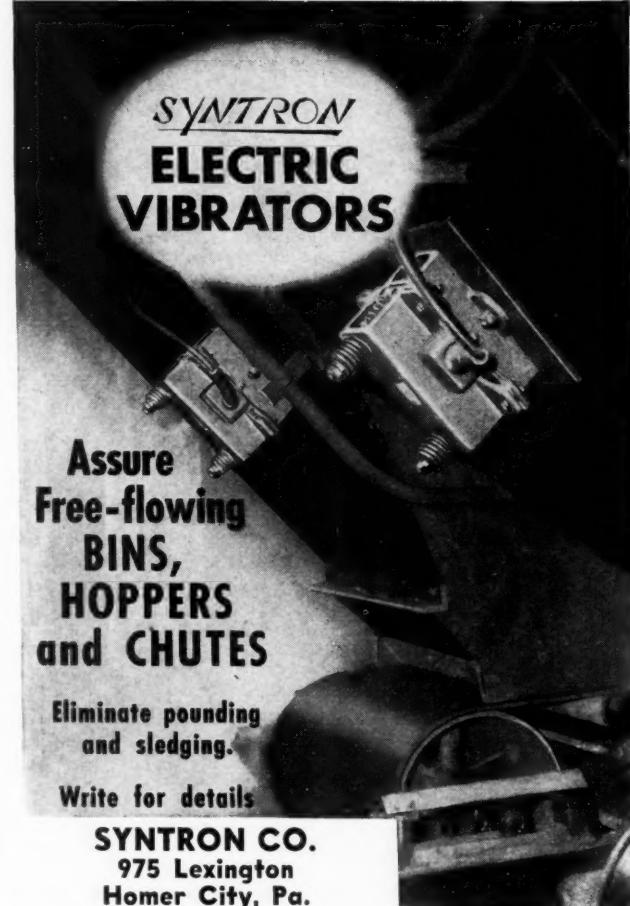


Powered by International Harvester Engines—
Diesel, gasoline or natural gas. 7 1/2 KW to 50 KW.

READY-POWER Engine Generators produce low cost electric power and permit the electrification of operations miles beyond the power lines. In many cases, important savings over central station power costs can be had. READY-POWER Engine Generators are sold and serviced by the world-wide International Harvester Power Unit dealer organization, and backed by the READY-POWER Company's twenty-two years of successful experience in producing engine generators.

THE READY-POWER CO.

11231 Freud Ave. • Detroit 14, Mich., U.S.A.



SYNTRON CO.
975 Lexington
Homer City, Pa.

DOWFLAKE
CALCIUM CHLORIDE 77-80%

makes more friends for coal

Dustproof

Freezeproof

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington
Cleveland • Detroit • Chicago • St. Louis • Houston
San Francisco • Los Angeles • Seattle

FLEX-LOC

... thin nuts made thus, are especially superior.

That's only one of the many reasons why "Flexloc" self-locking nuts will prove a wise buy. Just look at these advantages:

- ✓ It's all in one chunky piece and can, therefore, stand up under severe punishment
- ✓ Every thread—including locking threads—takes its share of the load
- ✓ Its construction is especially advantageous for maximum strength and dependability of thin nuts
- ✓ It accommodates itself to a very wide range of thread tolerances—from low #1 to high #3.
- ✓ It can be used over and over again without losing its ability to lock

It is not affected by temperatures likely to be met within the field of Mechanical Engineering.

✓ Being a "stop" nut, it stays locked in any position on a threaded member.

✓ It can be made of any of the conventional nut materials. Sizes from No. 6 to 1" in diameter; millions upon millions in use. Write for Bulletin 582. The famous "Unbrako" Socket Screw and "Hallowell" Shop Equipment Products are also made by us.

"Unbrako" and "Hallowell" products are sold entirely through distributors.

Over 43 Years in Business

STANDARD PRESSED STEEL CO.
JENKINTOWN, PENNA., BOX 738
BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS
SAN FRANCISCO

LUBRIPLATE No. 130-A

LUBRICATION PLUS!

A SUPER LUBRICANT—A MARVELOUS ANTI-SEIZE COMPOUND—A REAL PROTECTION AGAINST RUST AND CORROSION. From the standpoints of general utility and wide diversity of important uses, we do not believe there has ever been a lubricant that compares with LUBRIPLATE No. 130-A. It has everything. The outstanding performance of this super-lubricant and its adoption by industry in general are certainly adequate proof of its superiority.

... Write for the 28 page booklet, "The LUBRIPLATE Film." It tells about LUBRIPLATE Lubricants and where and how to use them.



LUBRIPLATE

FISKE BROTHERS
REFINING CO.

NEWARK 5, N. J.
TOLEDO 3, OHIO

DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK



**FLOORED
by
Ruts &
Holes?**

Don't let rough, broken floors get you "down". Eliminate the danger areas in your plant with STONHARD RESURFACER.

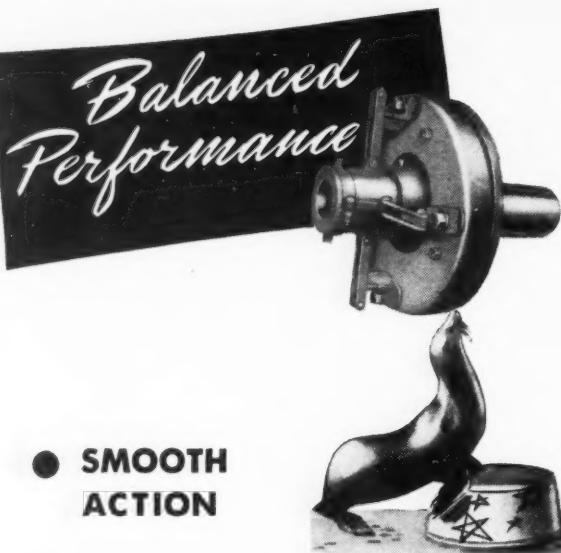
Easily applied as a patch or overlay for wood or concrete, tough STONHARD RESURFACER gives years of continued service.

*Our trial offer—"Satisfaction or no Charge."
Return this coupon for more information.*

STONHARD COMPANY
814 Terminal Commerce Bldg., Phila. 8, Pa.
Send us a free copy of your floor maintenance folder and information about STONHARD RESURFACER.

Firm
Mr. Title
Address
City Zone State

STONHARD COMPANY
Building Maintenance Materials
Serving the Railroads, Public Utilities and Industries Since 1922
401 N. BROAD ST., PHILADELPHIA 8, PA.



● SMOOTH
ACTION

KINNEY CLUTCHES

Rugged and compact, the Kinney Interchange Clutch engages easily, without chatter or grab. Transmits power directly through flat discs . . . handles heavy overloads without slipping. Capacity 2 to 40 HP per 100 R.P.M. Available in solid or split construction for easy installation. The line of Kinney Clutches is complete: Send for Bulletin K-8.

KINNEY MANUFACTURING CO.

3525 Washington St., Boston 30, Mass.

NEW YORK CHICAGO PHILADELPHIA
LOS ANGELES SAN FRANCISCO

We also manufacture Vacuum Pumps, Liquid Pumps and Bituminous Distributors.

The Cincinnati
TRADE MARK

Write today for FREE illustrated bulletin

ONE-MAN COAL DRILL

lowers drilling costs because it is designed and constructed to give more power "pound for pound" and more drilling efficiency "day after day". Used successfully in drilling both anthracite and bituminous coal. Easy to operate. Sold with money-back guarantee. Write today.

THE CINCINNATI ELECTRICAL TOOL CO.
Division of The R. K. LeBlond Machine Tool Co.
2635 MADISON ROAD - CINCINNATI 8, OHIO



PERFORATED METAL COAL MINING SCREENS

Manufactured exactly to your specifications. Any size or style screen, in thickness of steel wanted with any size perforation desired. We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.

2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

★

**BANTAM BUSTER
COAL CRUSHER**

McLanahan builds a type and size for every coal crushing requirement! Write for data.

Pit, Mine and Quarry
Equipment Headquarters

Established 1835

McLANAHAN AND STONE CORPORATION
HOLLIDAYSBURG, PENNSYLVANIA

Keep Your Track Bonded



Reduce resistance in your D.C. Circuits. Keep your rail bonds welded with this 40-lb. 250-v. portable welder (70 lbs. in 500-V size) and make quick repairs underground to loaders and cutters.

WRITE FOR FULL DETAILS

**FLOOD CITY
BRASS & ELECTRIC CO.**
JOHNSTOWN, PA.

WE specialize in buying
complete mines that
are going out of business
or from receivers in bankruptcy,
Administrators of estates, etc.



Frank J. Wolfe

COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING

L. D. Phone-34

TERRE HAUTE, INDIANA

POSITION WANTED

WANTED POSITION. As mine foreman, or assistant with a reliable company in West Virginia. Have had 8 years experience with Windsor Power House Co. L. A. Smith, Box 623, Wellsburg, W. Va.

BUSINESS OPPORTUNITIES

FOR SALE or Lease: Seven hundred acres Sullivan County, Indiana, number six vein coal located on Illinois Central Railroad, can be operated by Shallow shaft or slope. Write R. C. Whitsett, 543 N. 7th St., Steubenville, Ohio.

COAL LAND 12,000 acres in Oklahoma established coal field. Two 4 foot seams coking coal, shallow cover. For full particulars write P. O. Box 125, Pineville, Ky.

I CAN secure any number laborers working coal mines before Italians, Russian, Polish, Hungary etc. Will take any thing anywhere. Also I finance and operate boarding house if necessary. Phillip F. Mancuso, 251 Bowery, New York City. Phone GRAmery 7-8575.

FOR SALE Coal Mine in Columbiana Co., O., 60 acres 4 ft. No. 6 coal. More available, mine equipped to produce over 100 ton daily. Long lease low royalty. Good roads Rt. 30, best of markets. Will sell mines and equipment and sublet lease. Ill health. C. R. Basht, Box 22, Lisbon, Ohio.

FOR SALE: Coal 1000 A. 11 ft. 8 ft. no states near RR, 50 cash 20 in stock inclusive oil and gas. Henry Malany, Windsor Hotel, Cumberland, Md.

ENGINEERS WANTED

Experienced in estimating, layout and detailing of coal cleaning plants, coal tipplers and material handling plants.

Excellent pay and opportunities.

Roberts and Schaefer Company

307 North Michigan Avenue, Chicago 1, Ill.
Telephone—Central 7292.

E. C. MOLKE, Chief Engineer

SELL YOUR KNOWLEDGE OF MINING

A well established, financially sound manufacturer wants the services of mining engineers and operators to sell mine conveyors and mechanized equipment on a salary basis. Give full details of experience, and the territories and men you know best, when writing

SW-364, Coal Age
330 West 42nd St., New York 18, N. Y.

Air Compressors Wanted

Horizontal Water Cooled—100 CFM or larger; also
Gasoline or Diesel Driven Portable Machines

L. W. BAUER
North Bergen, N. J.

WANTED

Coal Washing Plant

Pennsylvania corporation will consider the purchase of a used coal washing plant. Washing unit must be of sufficient capacity to clean 165 tons per hour, wet washing 5x3/8" raw coal. 3/8x0 to by pass wash box.

W-368, Coal Age
330 West 42nd St., New York 18, N. Y.

WANT BUY SHOVEL

2 1/2 to 4 yd.

Diesel, Electric, Gas or Steam

DARIEN CORP. CONN.

PAY YOU CASH IMMEDIATE

FOR ASSETS or CAPITAL STOCK of . . .

- INDUSTRIAL PLANTS
- MFG. DIVISIONS or UNITS

All transactions held in strictest confidence.
Personnel retained wherever possible.

Address: Box 1217, 147 W. 42 St., New York 18, N. Y.

16,500 acres land with estimate of 300,000,000 tons of coal, \$7.50 per acre. Also coal land suitable for strip mining. Complete details upon request.

G. B. LORRAINE
Law Bldg. Richmond 19, Va.

COAL CUTTING MACHINES

- 1—35B Jef. 250 volts DC permissible shortwall.
- 1—35B Jef. 500 volts DC permissible.
- 1—35BB Jef. 250 volts shortwall.
- 1—35BB Jef. 500 volts shortwall.
- 1—35BB Jef. AC shortwall.
- 1—124EJ Goodman Arcwall.
- 1—36B Jef. 250 volts, 14" high.

ELECTRIC LOCOMOTIVES

- 1—13 Ton GE same.
- 2—13 Ton GE 500 volts.
- 2—5 Ton Goodman, 250 volts, 36" ga.
- 1—4 Ton Jef. 250 volts, 36" ga.

MISCELLANEOUS

- 1—100 KW West. Syn. M-G set, 250 V. D.C.
- 1—165 HP GE Syn. Motor, 2200 volts.
- 1—145 HP GE Syn. Motor, 440 volts.
- 1—250 HP Allis-Chalmers Sq. Cage Motor, 440 volts, 1170 RPM.
- 1—4000 GPM all bronze Cent. motor driven Pump.

TIPPINS MACHINERY COMPANY

1001 Washington Boulevard
Pittsburgh 6, Pa.

FOR SALE

- 1—300 K.W. Westinghouse, 3 phase, pedestal type Rotary Converter, 250 volt—needs armature rewind.
- 2—350A Smithway Arc Welders, 220/440 volt.
- 1—400A Lincoln Stable Arc Welder on wheels, 222/440 Volt 3 Phase.

GUYAN MACHINERY COMPANY
Box 150
Logan, W. Va.

FOR SALE

- 1—Slightly used Shovel boom, dipper and stick and chain for Lima Model 802
- 2—New unused Shovel booms, dipper and stick and attachments complete for Northwest Model 6

WALTER P. VILLERE CO.
1100 So. Claiborne Ave.
New Orleans 13, La.

FOR SALE

- 2 Goodman G-20 Shaker Conveyors with pans;
- 2 Goodman 90-L Elevating Conveyors: Immediate Delivery

WEST VIRGINIA MINE SUPPLY CO.
Clarksburg, W. Va.

SEARCHLIGHT SECTION

FOR
**IMMEDIATE
DELIVERY
OF
RUBBER PRODUCTS**

Conveyor Belting...Transmission
Belting...Elevator Belting...Fire,
Water, Air, Steam, Suction or
Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE
RUBBER HEADQUARTERS

**CARLYLE RUBBER PRODUCTS ARE
NEW, GUARANTEED & LOW PRICED**

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	— 1/16"	20"	5	1/8"	— 1/32"
42"	5	1/8"	— 1/16"	20"	4	1/8"	— 1/32"
36"	6	1/8"	— 1/16"	18"	4	1/8"	— 1/32"
30"	6	1/8"	— 1/16"	16"	4	1/8"	— 1/32"
30"	5	1/8"	— 1/16"	14"	4	1/16"	— 1/32"
24"	5	1/8"	— 1/32"	12"	4	1/16"	— 1/32"
24"	4	1/8"	— 1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets
Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

CARLYLE RUBBER CO., INC.

62-66 PARK PLACE

NEW YORK, N. Y.

FOR SALE

Diesel Bulldozer, 17 Ton
Used Mines Car Trucks 44" and 48" Gauge Timken and Hyatt Bearings.
200 Used Steel Mine Cars End Dump 44" Gauge.
Immediate Delivery

MANSBACH METAL COMPANY
Logan, W. Va. Phone 1071

LATHE

30" x 6" centers BRADFORD Lathe, cone drive, back geared, Schultheis A.C. M.D. with motor, 6" raising blocks, standard equipment. Price \$1650.00

CINCINNATI MACHINERY & SUPPLY CO.

218 E. Second St., Cincinnati 2, Ohio

FOR SALE

Locomotive Crane

Link-belt Electrically Driven
9 ft. Gauge 80 ft. Boom 8 Wheels
75 H.P. 3 Ph. 60 Cycle A.C. 440 Volts

Good Working Condition
With New Spare Parts.

Hoisting Speed.....178' per minute
Travel Speed.....288' per minute
Swing Speed.....2.2 Rev. per min.
Capacity at 73 ft. radius 7600# With Blaw-Knox Dreadnaught Handling Bucket 720-7 modified to 2-1/2 yds. capacity.

L. B. FOSTER COMPANY
11 Park Place, New York City

DO YOU NEED RAILROAD CARS FOR HANDLING SLATE, GOB, REFUSE, ETC.??

We offer for immediate shipment

62—50-Ton, All-Steel, Side Discharge Railroad Hopper Cars for Standard Gauge (4'-8 1/2") Track

15—130 Cu. Ft. Capacity, All-Steel Differential Automatic Air Dump Cars, Standard Gauge.

At Unbelievably Low Prices!!!

IRON & STEEL PRODUCTS, INC.

41 years' experience
13484 S. Brainard Ave.,
Chicago 33, Illinois

"ANYTHING containing IRON or STEEL"

BOILER: Erie City 150 H.P. self-contained, economic type ASME code, 150 lbs. pressure, complete with all fittings.

JAW CRUSHERS: Traylor 36 x 42, capacity 6" material 144 tons per hour, 4" material 76 tons per hour, manganese fitted, excellent condition. Also, other sizes 10 x 20 to 48 x 60.

HAMMER MILL: Dixie Mogul size 5024, hopper opening 40 x 24 with \$1000.00 worth of extra new wearing parts.

VIBRATOR FEEDER: Jeffrey Traylor 6' x 6', open pan deck, powered by four No. 5 heavy M-4 motors, including motor generator equipment for 440 volt, 3 phase, 60 cycle, operation; capacity 1500 tons of earth and stone per hour, maximum size stone 3' cubes.

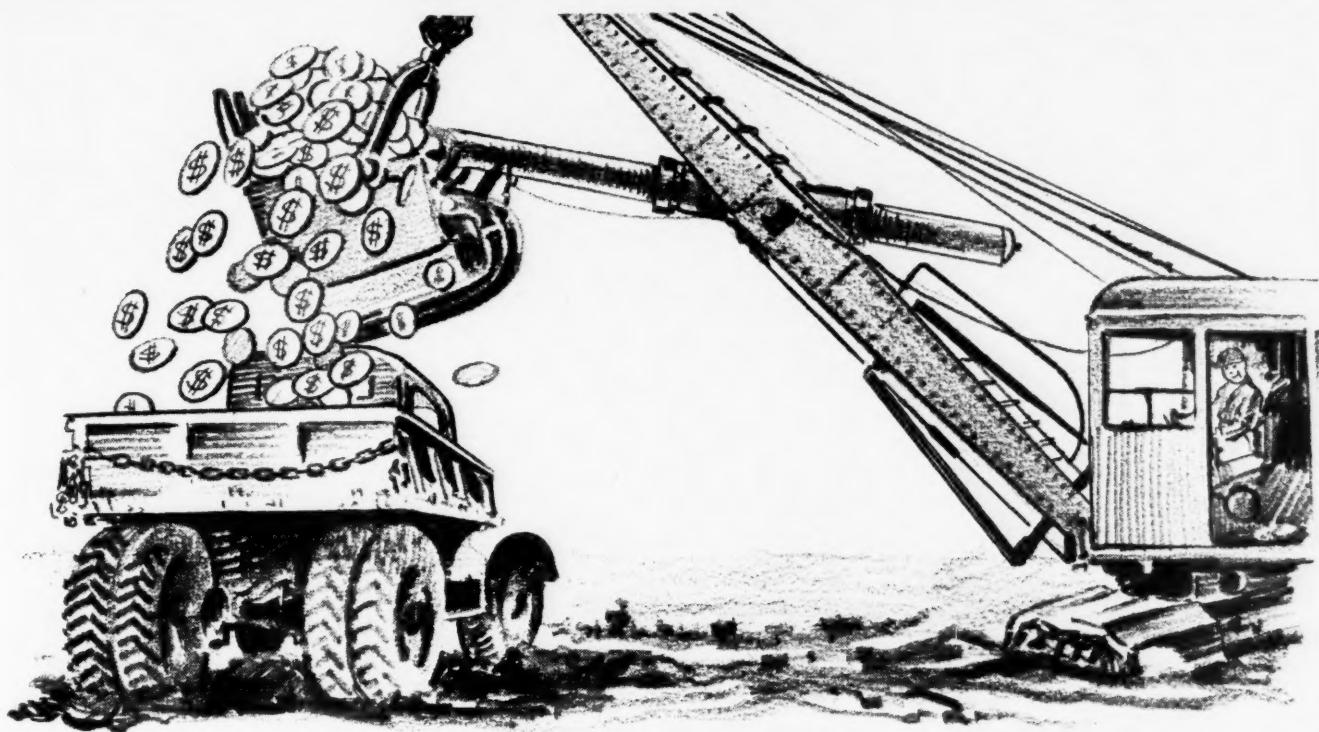
LOCOMOTIVE: Steam 1-Lima 80 ton, 6 wheel. Switcher with tender, thoroughly modern, excellent condition. Sale or rent.

LOCOMOTIVE: Gas—25 ton, standard gauge, air brakes, etc.

A. J. O'NEILL
Lansdowne Theatre Building
Lansdowne, Pa.
Phila. Phones: Madison 8300-0301

325—3-ton wooden rotary-dump mine cars, 42" gauge, 11' 4" total length, 5' 0" wide, 43" high with loading end cut down to 32"; equipped with 3 link couplers and timken bearings.

WALTER BLEDSOE & COMPANY
701 Merchants National Bank Bldg.
TERRE HAUTE, INDIANA



DIGGING DOLLARS for YOU! with ECONOMY'S "Pay-as-you-go Plan!"

Every dipper full of "Black Diamonds" means DOLLARS to you—and at once—when you call on ECONOMY CO. to provide striping and loading shovels on our famous "Pay-As-You-Go" Plan.

For our Coast-to-Coast listings will provide the shovels and we will offer you a liberal finance plan that makes it easy to earn while you work and pay for the shovels too.

Phone us "Collect"—day or night—any hour of the 24—and tell us your requirements.

20 YD. MARION ELECTRIC SHOVEL AND DRAGLINE

3/4 yd. Link Belt B-4 Shovel and Dragline Comb. Serial No. in 1200's. Cat. Diesel, entirely rebuilt.

3/4 yd. General Mod. 307 Dragline. Built in 1940 with Int. Diesel.

3/4 yd. Koehring Shovel and Dragline, Mod. 301. Price low. Freight prepaid.

1 yd. Marion Shovel Backhoe and Crane, Mod. 342. 1941 Mach. 50' boom.

1 1/2 yd. Koehring Mod. 501, Shovel and Dragline.

1 1/4 yd. Lorain 74B Shovel and Dragline. 50' boom, good condition.

1 1/4 yd. Byers Massillon Crane and Shovel. 50' boom.

5 yd. Bucyrus-Erie Mod. 120-B Shovel and Dragline. Rebuilt.

5 yd. Marion, Mod. 125 Dragline. Elect. power, 80' boom.

ECONOMY CO., Inc. 49 Vanderbilt Ave., New York 17, N. Y.

Telephone: MURRAY HILL 4-2294-8292-2295-2296

SEARCHLIGHT SECTION

LOCOMOTIVES

Goodman: All 250 volts.
1-6 ton, 30B, 42" 1-5 ton.
1-5 ton, W-1-2, 36".
2-5 ton, 2600 K.
2-6 ton, 33-1-4-T.
2-8 ton, 32-1-4-T.
Westinghouse: All 250 volts.
1-4 ton 902, 48" with crabs.
4-904 c, 44" 500 volt and 250 volt. Also
906 motors and 102-904 115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volt 4 ton 1022, 44", as is
6 ton 803, 44" as is 5 ton 825, 44" & 36"
6 ton 823, 44" 8 ton 839 motors
6 ton 801.
8 ton 839.
Battery Locomotive, Ironton, Whitcomb
and 1½ ton Mercury.
Jeffrey: 6 ton and 4 ton, all gauges, 250 volt.
8 ton, 250 and 500 volts, 10 ton, M1178—
13 ton MH110, 500 volts.

AERIAL TRAMWAYS • HOISTS • PUMPS • MOTORS • TRANSFORMERS • BOND WELDERS • RESISTANCE • COMPRESSORS • DUMPS • SPEED REDUCERS • FIELD FRAMES • ARMATURES • GOODMAN HYDRAULIC • SHOVELS • MOTOR STARTERS AND CONTROLLERS—AC & DC • DROP BAR SUPPORTS (Gooseneck), 29B and 29C • MINING MACHINE TRUCKS • SWITCHBOARDS • CIRCUIT BREAKERS—AC & DC • COAL CRUSHERS (double roll) 12" x 16", (single roll) 24" x 36", 24" x 24" • LATHE, SWITCHES • AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps • MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps • HOISTS, overhead, AC 3-60-440 1 ton and 2 ton • I clam shell bucket 1½ cubic yard • MINE CARS • 2 SULLIVAN BIT SHARPENERS • R. R. SWITCHES 85# to 100# GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also SPARE MOTORS DC and AC for mining machines and locomotives. BELT CONVEYORS, SLATE, LARRY, 2-5BU on Cats. 1-8BU on Cats. 2-Myers-Whaley, #3 and #4 Automatic and other loaders. DIESEL POWER PLANTS, 50 KW to 250 KW, 3-75 KVA and 9-100 KVA 44000 to 2300 Volt G.E. transformers.

GUYAN MACHINERY COMPANY, Logan, W. Va.

CUTTING MACHINES

2-29-B Jeffrey Arcwalls, 250 volt, any
gage
1-7-AU Sullivan hydraulic cutting and
shearing machine 250 or 500 volt
1-12-A Goodman Shortwall, 250 volt,
with or without truck
1-12-AA Goodman Shortwall, 250 volt,
with or without truck
1-CE-7 Sullivan Shortwall, 250 volt,
with truck

LOCOMOTIVES

1-6-Ton G.E. Type 700, 42" gage, 250
volt
1-6-Ton Goodman, Type 30-C, 250
volt, 42" gage

SUBSTATIONS

1-75-KW. G.E. M-G Set complete, 275
volt D.C. 2300 or 4000 volt A.C.

**A. C. & D. C. Stationary Motors, Starters, Transformers and
Miscellaneous Mine Supplies**

We solicit your inquiries

ALL-STATE EQUIPMENT CO.
LOGAN, W. VA.

Phone 884

LOADING MACHINES

5-L-400 Jeffrey, 250 volt DC.
3-7-BU Joy, 250 volt DC.
15-5-BU Joy, 250 volt DC.
8-Goodman type G-20 Duck Bill Con-
veyors, type 158, complete.

ELECTRIC LOCOMOTIVES

2-13-ton Jeffrey, 250 volt DC.
3-10-ton Goodman, 250 volt DC.
3-15-ton Goodman, 250 volt DC.
4-6-ton General Electric, HM-803, 250
volt DC.

MISCELLANEOUS

Several 3, 4 and 5-track Steel Tipples,
suitable for drift, slope or shaft mines,
complete. Electric Hoists from 150 to
1000 H. P. motors. Shortwall Mining
Machines. Motor Generator Sets. Ro-
tary Converters.

COAL MINE EQUIPMENT

SALES COMPANY

306-7 Beasley Building. Terre Haute, Ind.
L. D. Phone-34.

MINING MACHINES

Jeffrey: 35B and 4-28A, 250 V. 4-29B, 29C,
29CE with shearing head. Also 1 on cats.
Revolving head for 29C.
35BB Jeffrey mining machines.
1-35 BB AC 220 volt.
Goodman: 12A, 12AB, 12AA, 12G3A, 24B,
1-12C13, 220 volt, and 2-142 DA, 500 volt.
2-Permissible Type 12CA. 6-112AA.
Motors for 212AA, both 250 and 500 v.
1-Hitch Cutter for Cross Head timbers.
Sullivan: CE7, CE9, CE10, CR10 Low Vein.
CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

1-300 KW Westing. Rotary.
2-150 KW West. Rotary.
1-200 KW 1-100 KW Ridgway M-G Sets.
2-100 KW G.E. Rotary.
1-200 KW Westinghouse M-G Set 900 RPM,
2300-270 volt.
1-100 KW Westinghouse M-G Set.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, and MH
64-350 Volts and 500 V. 29B, 35B and
28A. **Goodman** 34B, 30B, 30C, 12A,
2600 K and R, 12AB, 12AA, 33-1-4-T,
31-1-4-T, 32-1-4-T. **General Electric**
801, 803, 807, 819, 821, 825, 839.
Westinghouse 904, 905, 906, 102, 907,
YR2, 115. Also 200 KW **Westinghouse**
Rotary Converter Armature, 250 V
Bracket Type, 150 KW G. E., HCC
Bracket Type, and 150 KW G. E., TC
Pedestal Type. **Sullivan** CE6, CE7, CE9
and CE10.

MINING MACHINES

AC OR DC

REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT

COAL CRUSHERS

Single & Double Roll

Electric Coal Drills, Mine Fans, etc.
Ironton 5-ton Storage Battery
Locomotive 36" or 42" Gauge, with
or without batteries

CONVEYORS—Belt and Drag
Equipment of all kinds

Buy, Sell or Exchange

**THE INDUSTRIAL
EQUIPMENT CORP.**

(Established 1902)

705 First National Bank Bldg.

Pittsburgh 22, Pa.

Warehouse: Carnegie, Pa.

RAILS

NEW AND
RELAYING

TRACK ACCESSORIES

from **5** Warehouses

• PROMPT SHIPMENTS

• FABRICATING FACILITIES

• TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY
PITTSBURGH • CHICAGO • NEW YORK

RELAYING RAIL

TRACK ACCESSORIES

MIDWEST STEEL CORP.

Gen. Off.: CHARLESTON, 21, W. VA.

Warehouses

CHARLESTON, W. VA.

KNOXVILLE, TENN. • PORTSMOUTH, VA.

RAILS—CARS

All sections of rails and good serviceable second
hand cars, all gauges, also spikes, bolts, frogs,
switches and ties.

M. K. FRANK

480 Lexington Ave. 810 Park Bldg., Fifth Avenue
New York, N. Y. Pittsburgh, 22, Pa.

Reno, Nevada Carnegie, Pa.

SPECIAL RAIL PURCHASE

3000 tons 90# ARA "B" FIRST QUALITY
RELAYERS complete with four hole angle
bars and new bolts.

200 tons 85# ASCE FIRST QUALITY RE-
LAYERS complete with six hole angle
bars and new bolts.

200 tons used "LUNDIE" tie plates . . . can
be repunched to fit any rail section.

All priced within OPA ceilings

Morrison Railway Supply Corp.

1439 Bailey Ave., Buffalo 12, New York

FOR SALE

TURBINE GENERATOR

Steam Terry, Type C-2, Serial #19031
500 KW, Steam Pressure 175 lbs. back
pressure 18 lbs. 1800 RPM with lubri-
cating oil pump for force lubrication to
governor and throttle control.

GLAZER STEEL CORP.

610 Chamberlain St., Knoxville, Tenn.

Phone 3-0738

SEARCHLIGHT SECTION

CALL MOORHEAD

In Pittsburgh

FOR REBUILT MINING EQUIPMENT

MINING MACHINES

CE 7 Sullivan 250 v. 6" bar, any gauge, rebuilt.
2-35 B Jeffrey 250 v. Permissible, 8½" bar.
2-35 B Jeffrey 500 v. Permissible, 8½" bar.
12 A Goodman 35 HP 250 v. 6" Bar, rebuilt.
12DA Goodman 50 HP 250 v. 6" bar, rebuilt.
2-35L Jeffrey Low Vein 6" AC Shortwall, rebuilt.

STORAGE BATTERY LOCOMOTIVES

3-6 Ton G.E., permissible 36/44" Ga. HM 825 BB Motors. 2 with Edison Batteries.
Haulage & Gathering Locomotives.
4 Ton 36" Ga. Atlas 2 BB Motors.

Haulage & Gathering Locomotives

1-15 Ton Westgh. 250 v. 36" Ga.
13 Ton Westgh. 250 v. 36" or 40" Ga.

13 Ton Westgh. Bar Steel 500 v. 40/42" Ga.

2-13 Ton G.E. 5" armorplate 500 v. 44" Ga.

10 Ton Jeffrey MH 110. 250 v. 36/42" Ga.

COAL CRUSHERS

18x24 and 18x30 New Scottdale dbl. roll.

AIR COMPRESSORS

1300 cu. ft. 100# Pres. Worthington 2 stage Belted.

490 cu. ft. 100# Worth.—100 HP Syn. Motor.

9" x 8" Sullivan Portable—motor driven.

REDUCTION UNITS

500 HP Morse ratio 4.28 to 1.

250 HP Ottumwa ratio 12.7 to 1.

2-40 HP Ohio Forge ratio 45 to 1.

MOORHEAD-REITMEYER CO., INC.

Serving the Coal Industry for more than a Quarter of Century

Rotary Con. & MG Sets (3 ph. 60 cy.)

640 KW Al. Ch. 250 v.—860 HP Syn.
500 KW West. Rotary Converter 275 v. 6 phase 1200 RPM with transformers and switchboard.
300 KW G.E. HC 12 Rotary 275 v. 6 ph.
200 KW West. 250 v. 720 RPM—300 HP 2200 v. West.
150 KW Ridgway 275 v. 900 RPM dir. con. 225 HP.
75 KW West. Elec. 250 v.—2200 v. 900 RPM.
50 KW G.E. 125 v.—75 KW West. 220/440.
35 KW G.E. 250 v. 900 RPM—50 HP G.E. 440/220.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
500	G.E.	450	S.R.	MT 412
350	Al. Ch.	720	S.R.	
350	G.E.	900	S.R.	I-M
300	G.E.	700	S.R.	M
300	West.	1750	S.R.	CW
200	G.E.	240	S.R.	MT 412
150	West.	600	Syn.	
100	West.	1750	S.R.	C-I
100	G.E.	500	S.R.	M 1-25 cy.
100	G.E.	1200	S.C.	KF
75 (3)	G.E.	720	S.C.	K
75 (3)	G.E.	600	S.C.	K
60 (3)	G.E.	514	S.C.	K
50	G.E.	900	S.R.	I-M
40 (3)	G.E.	600	S.R.	MT
40	G.E.	900	S.R.	MTC
25	F.M.	1200	S.C.	

AUTOMATIC RECLOSEING BREAKERS

400 amp. Type ARL breaker.
600 amp. Type MSB breaker.
1200 amp. Type MSB breaker.
2000 amp. Type DHDX breaker.

HP	Make	Speed	WDG	T
175	G.E.	475	ser.	MD 109
130	G.E.	550	ser.	CO 1812
160	G.E.	480	ser.	MD 108
75KW	West.	1000	ep.	S
50	Reliance	1500		185T
40	Roth	1500		SK 80L
25	West.	825	ep.	SK 113
20	West.	750		SK 113
15	West.	850	ep.	SK 93
15	West. (Ene.)	800	sh.	CM
13	West. (Ene.)	825	ep.	SK 113
7½	G.E.	825		CVC
7½	New West. Vert.	1750	sh.	SK 284
3	New G.E.	1150	ep.	B 254

HOISTS

150/200 HP Lidgerwood sgl. drum slope, drum 42" Dia. 36" wide, 10" Flanges.
75 HP Vulcun 2 drum shaft, S.R. Motor.

40 HP Lidgerwood sgl. fr. drum geared to 40 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev.

30 HP Carlin double dr. fr. 13" x 18" — 5½" flgs.

PUMPS

7½ HP Weinman bronze 3" x 3" — AC Motor.
2-400 GPM 170' Head Lea Courtney 4" suc. 4" dls.

500 GPM 135' Head Janesville 4" suc. 3" dls.

700 GPM 160' Head DeLaval 6" suc. 6" dls.

Pittsburgh 19, Penna.

Mayflower 7900

FLORENCE MACHINERY & SUPPLY CO.

REBUILT COAL MINING EQUIPMENT

BLOWERS

1-12" Buffalo Vent Blower, with 3 H.P. Motor

1-30" Buffalo No. 6 Cupola & Forge Blower, with 2 H.P. Motor

1-No. 8 Clarge Blower-Exhauster, with 3 H.P. Motor

PIT CARS

105-1 Ton R. B. Card, 36" Ga.

119-1 Ton P. B. Card, 36" Ga.

COAL CUTTERS

3-CE-7 Sullivan, 220 or 440 Volts AC

1-29 LE Jeffrey, 250 Volts DC, mounted on Joy Cats

1-Goodman Universal, 250 Volts DC

1-Goodman Standard, 250 Volts DC

LOADERS

1-Manierre Type Box Car Egg Loader

1-7-BU Joy Loader, 250 Volts DC

BELT CONVEYORS

1-36" Picking Conveyor, 20' Centers

1-28" Apron Egg Conveyor, 21' Centers, Gear Drive

1-18" Drag Chain Conveyor, 8' Centers, Motorized

1-16" Jack-Knife Drag Chain Conveyor, 18' Centers, Motorized

6-16" Belt Conveyors from 20' to 195' Centers — all Motorized (Located El Paso, Texas)

1-9" Drag Chain Conveyor, 60' Centers, Motorized

GENERATORS

1-100 KVA West. Syn. Motor, 2300 Volts AC

1-96 KW, 2300 Volts AC, direct connected to a 14x17 Chuse Engine

1-25 KW Crocker-Wheeler, 250 Volts DC

1-15 KW Ft. Wayne, 480 Volts AC

MISCELLANEOUS

1-6 Ton Jeffrey Trolley Locomotive, 36" Ga.

1-8 Ton Jeffrey Trolley Locomotive, 36" Ga.

3-Double Deck Mine Cages

4-3 x 4½" Goulds Pyramid Pumps, Motorized

1-5x5 Deming Oil-Rite Pump, Motorized

1-3x3 Deming Oil-Rite Pump, Motorized

10-Tons 85# Rail

1-50 H.P. G.E. Slip-Ring Motor, 3 ph. 60 cy. 220/440 volts, 1725 RPM with Cont. & Grids

Enclosed Safety Switches, 30 to 600 Amps.

We have a complete stock of practically everything

Write for Stock List

904 EQUITABLE BLDG.

DENVER 2, COLORADO

Yards: Denver and Florence, Colorado

FOR SALE

250v DC Motors. Two stage centrifugal bronze pump. Triple pump. Mining machine cable. 100 KW GE Generator. Rebuilt Jeffrey Pit Car Loader, makes good elevating conveyor.

MID-CONTINENT COAL AND COKE CO.
Sturgis, Ky.

NEW and REBUILT

STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge

GREENSBURG MACHINE CO.

Greensburg, Penna.

REBUILT MINING EQUIPMENT

DOUBLE DRUM HOIST

1-50 HP Lidgerwood Double Drum Hoist, drums 24" x 24", good for 5000# RP and 4000 ft. of ½" rope, motor driven

MOTORS - GENERATORS - TRANSFORMERS

JOHN D. CRAWBUCK CO. PGH. (12) PA.

SEARCHLIGHT SECTION

FOR SALE

MINING MACHINES

- 3—Goodman Longwall mining machines, DC, 36" or 42" gauge.
- 6—Jeffrey 35A Shortwall mining machines, 50 HP motors, 250 volts, DC, 6' cutter bars, 36" or 42" gauge.
- 2—Sullivan CH-11 Shearing Machines, 250 volts, DC, 7 ft. cutter bars, 36" or 42" gauge.
- 1—Sullivan CH-11 Shearing machine, AC, 220 volts, 3 ph, 60 cy, 7 ft. cutter bars, 36" or 42" gauge.
- 1—Sullivan CE-7 Shortwall mining machine, AC, 220 volts, 3 ph, 60 cy, tip-turn truck, 7 ft. cutter bar, 36" or 42" gauge.
- 2—Sullivan Longwall mining machines, AC, #2991, =7061.
- 1—Sullivan CR3 Shortwall Cutting Machine 250 volts DC. Late style rope type machine complete with electric cable and reel.
- 2—Sullivan CLES Longwall mining machines, AC, 220 volts, 4 ft. cutter bars.

LOCOMOTIVES

- 3—Goodman 5 ton locomotives, type WI-2A5, 36" or 42" gauge. One is complete with electric reel.
- 2—Goodman 6 ton ball bearing locomotives, type 3314T, 36" or 42" gauge.
- 1—6 ton Goodman locomotive, type 13314T, 250 volts, 4 1/2" gauge, ball bearing motors.
- 1—Goodman 4 ton locomotive, type 76A04T, 26" gauge.
- 1—Goodman 4 ton locomotive, type 75A04T, 28" gauge.

STEEL TIPPLES

- 1—Tipple and shaker constructed by Allen and Garcia Company. Capacity 3000 tons daily. Have new and second hand rails and track accessories.

DUCKBILL

- 1—Goodman New Type, DC, type G20 Duckbill complete with pans.

PUMPS

- 1—3"x3" Carver Pump, model A3815, capacity 20,000 GPH, 50' head, direct connected by V-belt pulleys to 5 HP Western Elec. motor, 3/60/220 volts, 1800 rpm.
- 1—Gould Centrifugal pump #112851, 4", 3 stage, 250 gals per min., 231 ft. head, direct connected to 30 HP Allis Chalmers DC motor 1750 rpm, 230 volts. Pump and motor mounted on cast iron base. Complete with automatic float switch.
- 1—Fairbanks Morse size 2 centrifugal pump, #5870 N, capacity at 250' head 60 gals per min., at 150' head 180 gals per min., direct connected to 10 HP West. motor 3/60/220/440 volts, 3600 rpm.

VIBRATOR

- 1—Tyler-Niagara Vibrating screen, single deck, type 100. No. 8050, 57" long by 24" wide.

SCALES

- 1—100 ton Fairbanks Morse Railroad scale, 54' platform, recently overhauled, standard gauge, #E 121880.

CRUSHERS

- 1—American Pulverizer Company crusher, ball bearing, type S No. 24, will crush from 18" down to 1/2". This crusher is equipped with an AC enclosed motor, ball bearing, fan ventilated type, 30 HP, 600 rpm, 440 volts, 3 phase, 60 cycle, direct connected to crusher with a flexible coupling.

- 1—American Pulverizer Company Rolling Ring Crusher size No. 24, serial number 1030. This crusher has a sub-base and a flexible coupling but no motor. Crushes from 20" down to 3/4".

We are distributors for John A. Roebling Sons Company wire rope and fittings.

GAVENDA BROTHERS

CANTON, ILLINOIS

-TRANSFORMERS-



TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign all Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR
Write for Catalog No. 135-F

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI, OHIO

PIPE—MACHINERY—GAS ENGINES AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY
WAYNE, WOOD COUNTY, OHIO
Near Toledo

FOR SALE

Steel Window Sash

253 horizontal fixed pivot type sash 5'2" high by 6'0-3/4" wide.

Write, wire or phone

GLAZER STEEL CORPORATION
610 Chamberlain St., Phone 3-0738
Knoxville, Tennessee

IRON and STEEL PIPE

New and Used

Large stocks, all sizes
attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 Pittsburgh 30, Pa.

STEEL TANKS

12—42,000 Gal. cap. VERTICAL
2—25,000 gal. cap. VERTICAL
20—10,000 gal. cap. VERTICAL
60—4,200 gal. cap. VERTICAL
6—8,000 gal. cap. R.R. CAR TANKS

L. M. STANHOPE
Rosemont, Pennsylvania

Electrical Equipment

Converters, Motor Generator Sets, A. C. & D. C. Motors, Control Equipment and Transformers. We build equipment to fit your requirements. Over 25 years engineering background.

C. B. LOCKE CO.
P. O. BOX 3227
TEL. 38-136
CHARLESTON W. VA.
NEW and
REBUILT

For Sale—

SHASTA DAM SAND AND GRAVEL PLANT AND 10-MILE CONVEYOR EQUIPMENT

Including:
6000—36" AND 42" IDLERS.
Pulleys and Drives.
LATE MODEL 200 HP., 1800 R.P.M.
GE MOTORS, complete with Starting
Equipment.
Western Gear Reducers, 200 HP., 40
to 1 Ratio.
8 x 12 MARCY ROD MILL.
Dorr Hydroseparators.
30" Tripper and Trestle.
Merrick Weightometer.
All Types of Pumps, complete with
Drives.
42" Pendulum Boom Conveyors, 100'
and 200'.
Electric Line Equipment, Transfor-
mers, Motors and Supplies.
Other Miscellaneous Contractors'
Equipment.

Subject to Prior Sale
Write, Wire or Telephone Redding 1440
COLUMBIA CONSTRUCTION CO., INC.
Box 579 Redding, California

VIBRATING SCREENS

CRUSHERS—SCALES

Immediate Shipment

3'x6'—1 deck Vibrat. Screen.....	\$495.00
3'x6'—2 deck Vibrat. Screen.....	595.00
3'x8'—1 deck Vibrat. Screen.....	585.00
3'x8'—2 deck Vibrat. Screen.....	685.00
3'x8'—3 deck Vibrat. Screen.....	885.00
Stoker Coal Crusher.....	345.00
Large Coal Crusher.....	795.00
15 Ton Truck Scale.....	450.00
20 Ton Truck Scale.....	510.00
5 Ton Tipple Scale.....	260.00

BONDED SCALE COMPANY

2190 S. Third St., Columbus 7, Ohio
Phone GA 5712 UN 2832 Evenings

Visit our factory. We manufacture more
than 150 models of Scales, Screens,
Crushers, and Conveyors. Inspect several
models in operation.

SEARCHLIGHT SECTION

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—300 KW 600 rpm, 250 v. DC Al. Chal. Gen. dir. driven by 450 HP 2200 v. 3/60 Al. Chal. Syn. Mtr. 1—150 KW 1150 rpm, 250 v. DC Westg. Gen. dir. con. to 225 HP 1150 rpm. 440 v. 3 ph. 60 cy. Westg. Motor. 2—150 KW, 250/275 v. DC Ridgeway Motor Generator Sets driven by 225 HP, 2200 v. 3 ph. 60 cy Ridgeway Synchronous Motors. 1—100 KW, 250 v. DC Ridgeway Motor Generator set with 2—50 KW. Generators driven by 1—150 HP. 2300 v. 3 ph. 60 cy. Synchronous Motor. 1—80 KW 720 rpm, 250 v. DC G.E. Gen. V-belt driven by 150 HP 1800 rpm. 220 or 440 v. 3/60 West. Mtr. 1—30 KW 250 v. DC cp. wd. Gen. dir. con. 220/440 v. 3 ph. 60 cy. AC Motor. 1—30 KW 250 v. DC 1200 rpm. G.E. Gen. dir. con. to 220/440/220 v. 3/60 syn. motor. 1—20 KW 1150 rpm, 250 v. Westg. Gen. dir. driven by 30 HP 1150 rpm. motor.

MINE LOCOMOTIVES

1—5 ton Ironton Storage Battery Locomotive.

PUMPS

1—Amer. Piston Pump— $5\frac{1}{2} \times 4\frac{1}{2}$ "—size 8x12. 1—48 GPM 161' hd. Roper 3" suc. 3" dis. 1—90 GPM 225 ft. head, 600 rpm. 2x2" Blackmer. 2—160 GPM, 50 ft. head Allis Chalmers. 1—220 GPM 225 ft. head, 600 rpm. 3 $\frac{1}{2}$ "x3" Blackmer. 2—243 GPM, 100 ft. head Dayton Dowd. 1—239 GPM, 65 ft. head Dayton Dowd. 1—359 GPM, 130 ft. head Dayton Dowd. 6—378 GPM, 44 ft. head Dayton Dowd.

MINE HOISTS

1—Thomas 24" dia. Drum with 50 H.P. Motor & Control. 1—Ottumwa 36" dia. Drum with 75 H.P. Motor and Control. 1—Wellman, Keyed Drum, 60" Dia. will coil 4500 ft. 1" rope, 200 or 300 H.P. Motor with Magnetic Control. 1—Vulcan, Shaft Hoist, 72" Dia. Suitable 300 ft. shaft. Motor with control to suit requirements. 1—Nordberg, Shaft Hoist, 72" Dia. Suitable 200 ft. shaft. 150 H.P. Motor with Control. 1—Vulcan, Cylindro-Conical, Shaft Hoist. Drum 7 $\frac{1}{2}$ " Dia. Suitable 350 ft. shaft. 400 H.P. Motor with Control.

Other Hoists Available to suit all mining conditions.

JONES MINING EQUIPMENT CO.
Empire Building, Pittsburgh 22, Pa.

NEW A. C. MOTORS USED AC & DC MOTORS

35 KWMG Set. Centrifugal Pumps
Agents

CUTLER HAMMER CONTROLS
ARMATURE & MOTOR REWINDING

UNITED ELECTRIC & MACHINE CO.
315-317 Cherry St. Terre Haute, Ind.

WESTINGHOUSE

TYPE SK — MOTORS
America's Best Stock

WIRE INQUIRIES COLLECT

MOTORS, GENERATORS,
TRANSFORMERS
BOUGHT & SOLD

For prompt action, wire specifications collect

ELECTRIC EQUIPMENT CO.
PHONES: GLENWOOD 6783-6784-6785
63 CURLEW STREET, P.O. BOX 51 • ROCHESTER 1, N.Y.

2—500 GPM Morris Machine Wks. 4" suc. 4" dis. 123" hd. 1760 rpm. 2—500 GPM 70 ft. head Allis Chalmers. 1—2000 GPM DeLaval 170' head. 1—3000 GPM DeLaval 144' hd. 150 HP. 1—3500 GPM DeLaval 130' hd. 1450 rpm.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
400	Westg.	CW	2200	435
350	Westg.	CW	2200	900
1—150	HP.	1200 v. type I-M.	General Electric	
50-60	Westg.	CW	220	1800
50	Chand.	220/440	1800	
5	Duquesne	220/440	1200	
40-50	Westg.	CW	220/440	1200
15	G.E.	ITC-5009	220	900

230 V. DC MOTORS

HP	Make	RPM	Type
80	West.	400	76A
25	Westg.	600	SK
25	G.E.	650	MD
20	Westg.	600	M
20	Westg.	1750	SK
20	West.	975	S
15	Al. Ch.	800	
15	Westg.	1700	SK
13 $\frac{1}{2}$	Al. Chal.	700	
13	Cr. Wh.	1100	CM
10	Cr. Wh.	675	33M
10	Cr. Wh.	825	CM
10	Westg.	1750	SK

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

8	G.E.	950	RC-11
7.5	Electro Dynamic	1750	M
7	Westg.	750	SK
5	Westg.	400	

ALTERNATING CURRENT MOTORS

HP	Make	Volts	RPM	Type
150	Wagner	440	1800	31V
100	Westg.	220/440	860	CCL
75	Triumph	220	685	B15
60	Westg.	220-440	1800	
50	Westg.	220	1200	CD
50	Chandeysson	220/440	1800	
50/32	G.E.	440	800/640	POS
30	Westg.	220/440	680	CS
30	West. Elec.	440	1200-1800	
25	Westg.	440	575	CS
25	Westg.	440	1200	CS
20	Westg.	440	860	CS
20	Westg.	220/440	515	CS
15	Triumph	220	1150	
15	Westg.	440	720	CS

MAGNETIC STARTERS

40—NEW, 5, 7 $\frac{1}{2}$, 10 and 15 HP 230 v. DC Cutler Hammer drip proof Magnetic Starters.

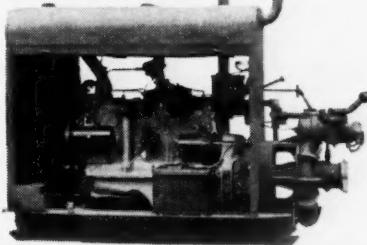
COMPRESSORS

2—315 CFM Ingersoll Rand portable 100# pres. driven by 105 HP Waukesha Oil Engines, 860 rpm. 1—150 cu. ft. 100# pressure National Brake & Electric Compressor direct driven by 30 HP 220 or 440 v. 360 motor with control.

MINE FANS

3—15,000 cu. ft. Clarge Fans 10 HP motors.

HIGH PRESSURE ALL PURPOSE PUMP PRACTICALLY NEW



Big heavy duty Chrysler gasoline engine driven centrifugal pump. 500 G.P.M. at 120 lbs. pressure or 250 G.P.M. at 200 lbs. pressure. Equipped with self starter—skid mounted—self priming. Rugged unit ideal for water supply—fire fighting—booster service!

Same unit also comes mounted on 2 wheel Pneumatic-tired, spring-mounted carry-all trailer with ball and socket towbar, rear reflectors and parking brakes. Net weight approximately 2100 lbs. 11 foot 7 inches long x 79 inches wide x 70 inches high.

Also Available FRONT MOUNT PUMP

It can be mounted on '38, '39, '41 Fords; '38, '39 Chev.; and '40 Intl. trucks. Complete with adapter bracket and accessories.

Write or Phone for Further Information.

KADCO CORPORATION
DEPT. C

36-38 11th St. L. I. C., N. Y.
IRonsides 6-8604

For Immediate Delivery

1—680 KW NORDBERG UNAFLOW Engine Generator SET: Left hand, non-condensing, 3/60/440.

1—750 KW NORDBERG Corliss Engine Generator SET: non-condensing, 3/60/440.

1—27 Ton Standard Gauge, Baldwin Saddle Tank LOCOMOTIVE.

1—62 Ton American-Consolidation Standard Gauge LOCOMOTIVE, ICC.

14 MILES RAIL.

Machine Shop, Blacksmith Shop, Motors, Tools, Supplies, etc.

WIRE - WRITE - PHONE
Send for Printed Circular

NEWBERRY MANUFACTURING CO.

P. O. Box 295 Newberry, Michigan

Telephone Newberry 16

DIESEL TRUCK-TRAILERS

7—Autocar—Sanford Day 25-yd. Diesel heavy duty tractor—truck-trailers, good rubber and 150 HP motors, mechanical trip bottom dump, 1940-41, Midwest.

Also 3—Dart—United heavy duty 25-yd. gas bottom dump tractor-truck-trailers, all good condition, Midwest.

H. Y. SMITH CO., 828 N. B'way., Milwaukee 2, Wis.

40 TON LOCOMOTIVE

American 14 x 22, 4 Wheel Std. Ga. Saddle Tank Locomotive ASME Boiler—Ready to work

DARIEN CORP.

MURRAY HILL 2-0042

60 E. 42 St. N. Y. 17, N. Y.

FOR SALE

1250 HP/850 KW. McIntosh-Seymour Diesel Engine Generator 60/3/2300.

750 HP International Diesel Engine 327 RPM, 6 cylinders, 16" bore x 20" stroke.

750 HP Superior Diesel Engine 8 cylinder, 4 cycle, 14 $\frac{1}{2}$ " bore x 18" stroke, 327 RPM.

GLAZER STEEL CORPORATION

610 Chamberlain St., Knoxville, Tenn.

Phone 3-0738

COAL AGE ADVERTISERS IN THIS ISSUE

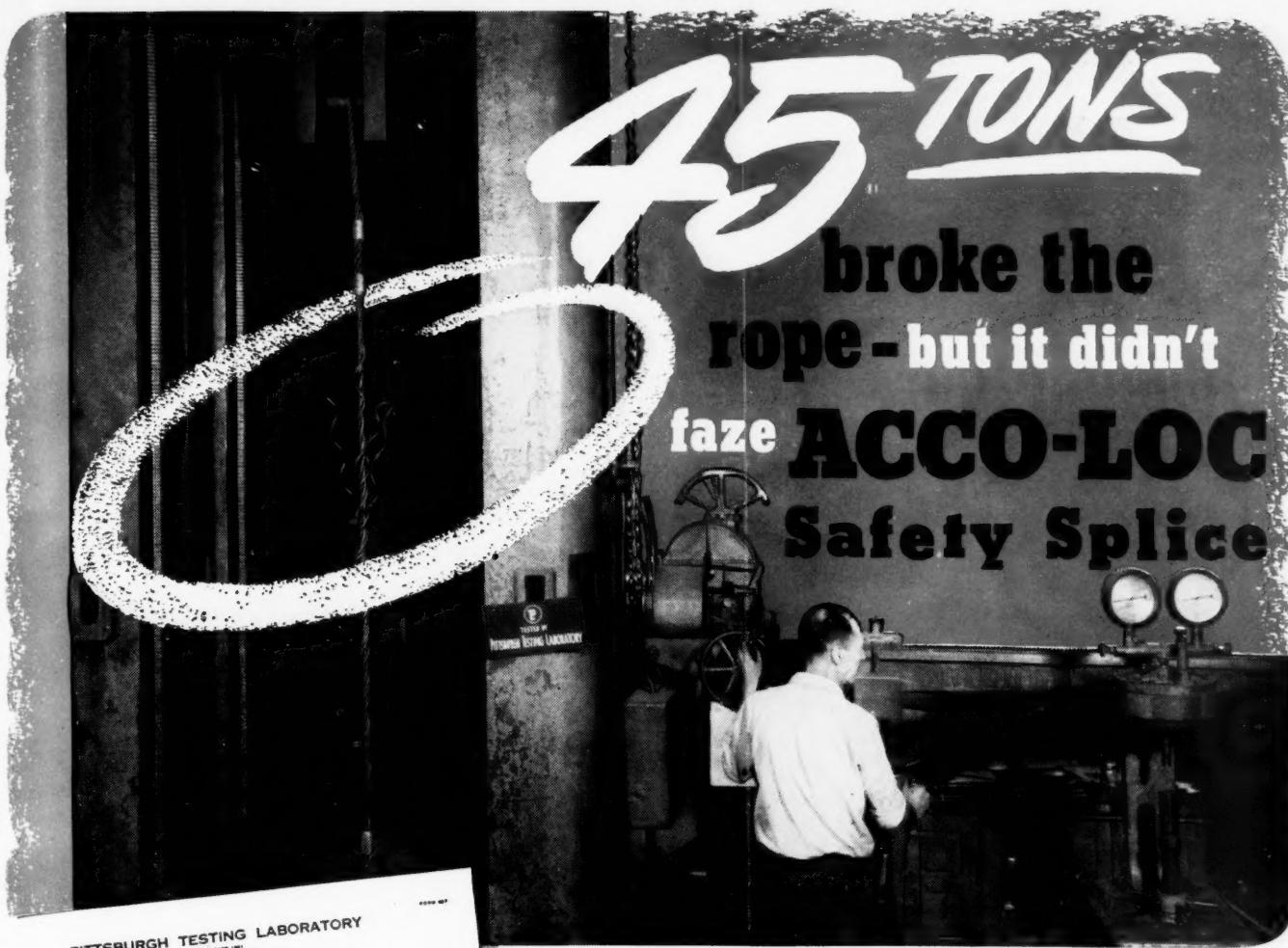
An asterisk preceding manufacturer's name indicates detailed information may be found in the 1945-46 MINING CATALOG

Acker Drill Co.	164	Greensburg Machine Co.	168	*Simplex Wire & Cable Co.	136
Acme Compressor Co.	166	Grimmell Co., Inc.	135	Socony Vacuum Oil Co.	109
*Allis-Chalmers Mfg. Co.	8, 9, 25	Gulf Oil Corp.	37	Standard Oil Co. (Indiana)	54
Aluminum Company of America	133	Gulf Refining Corp.	37	Standard Pressed Steel Co.	191
*American Cable Div. of American Chain & Cable Co.	Third Cover	Guyan Machinery Co.	162	Stearns Magnetic Mfg. Co.	170
American Car & Foundry Co.	Insert between pp.	Harnischfeger Corp.	18, 19, 188	*Stephens-Adamson Mfg. Co.	20
American Crucible Products	168	*Hauck Mfg. Co.	166	Stonhard Co.	191
*American Cyanamid & Chemical Corp.	61	*Hazard Insulated Wire Works	4	Stoody Co.	146
*American Hoist & Derrick Co.	172	Hercules Powder Co.	131	*Sullivan Div., Joy Mfg. Co.	147
American Manganese Steel Div.	156	*Holmes & Bros., Robt.	150	Sun Oil Co.	Second Cover
*American Mine Door Co.	60	Hulbert Oil & Grease Co.	2, 3	Syntron Co.	190
*American Pulverizer Co.	56	I-T-E Circuit Breaker Co.	175		
Anaconda Wire & Cable Co.	101	Imperial Cantrell Mfg. Co.	165	Templeton, Kenly & Co.	185
Armeo Drainage & Metal Products	187	*Independent Pneumatic Tool Co.	46, 47	Texas Co.	12, 13
Atlas Powder Co.	52	*Indiana Foundry Co.	188	Thermoid Rubber Div., Thermoid Co.	137
Barber-Greene Co.	180	International Harvester Co.	44	Tide Water Associated Oil Co.	45
Bemis Bro. Bag Co.	168			*Timken Roller Bearing Co.	53
*Bethlehem Steel Co.	28				
Boston Woven Hose & Rubber Co.	33				
Broderick & Bascom Rope Co.	145				
*Buckeye Traction Ditcher Co.	181				
Calcium Chloride Ass'n.	167				
Cardox Corp.	40				
*Carver Pump Co.	161				
Central Mine Equipment Co.	111				
Centrifugal & Mechanical Industries	174				
Chesapeake & Ohio Railway	48				
Chevrolet Motor Div., General Motors Corp.	38, 39				
Chicago Perforating Co.	192				
*Cincinnati Electrical Tool Co.	192				
*Cincinnati Mine Machinery Co.	114				
Coal Operators Casualty Co.	164				
Coffin Hoist Co.	172				
*Collyer Insulated Wire Co.	149				
*Continental Gin Co.	188				
Crane Co.	50				
*Cummins Engine Co.	29				
*Deister Concentrator Co.	140				
*Dorr Co.	184				
*Dow Chemical Co.	191				
Duff-Norton Mfg. Co.	170				
*duPont de Nemours & Co., E. I. (Grasselli Div.)	132				
*duPont de Nemours & Co., E. I. (Ventube Div.)	138				
*Edison Storage Battery Div., Thomas A. Edison, Inc.	34				
*Elastic Stop Nut Corp. of America	126				
*Electric Storage Battery Co.	97				
*Ensign-Bickford Co.	64				
*Enterprise Wheel & Car Corp.	153				
Firestone Tire & Rubber Co.	51				
Flexible Steel Lacing Co.	189				
*Flocker & Co., John	186				
*Flood City Brass & Electric Co.	192				
Gar Wood Industries, Inc.	36, 49				
*Gardner-Denver Co.	179				
Gates Rubber Co.	129				
*General American Transportation Corp.	141				
General Electric Co., Apparatus Dept.	6, 7				
General Electric Co., Appliance & Merchandise Dept.	130				
General Tire & Rubber Co.	57				
Goodman Mfg. Co.	16, 17				
Goodrich Co., B. F.	1				
Goodyear Tire & Rubber Co.	10, 11				
*Gorman-Rupp Co.	152				
Gould Storage Battery Co.	105				
Goyne Steam Pump Co.	190				
		Ready-Power Co.	190		
		Reliance Elec. & Engrg. Co.	160		
		Roberts & Schaefer Co.	35		
		Robins Conveyors, Inc.	169		
		*Rochester Ropes, Inc.	128		
		*Rockbestos Products Corp.	171		
		Roehling's Sons Co., John A.	14, 15		
		*Ruberoid Co.	162		
		SKF Industries, Inc.	173		
		*Sanford Day Iron Works, Inc.	58, 59		
		*Schramm, Inc.	127		
		Searchlight Section	193-199		
		Shell Oil Co.	155		

PROFESSIONAL SERVICES 176

SEARCHLIGHT SECTION Classified Advertising

EMPLOYMENT	193
BUSINESS OPPORTUNITIES	193
WANTED TO PURCHASE	193
USED AND SURPLUS EQUIPMENT	193-199
All State Equipment Co., Inc.	196
Bonded Scale Co.	198
Bradford Supply Co., Inc.	198
Bauer, L. W.	193
Bledsoe & Co.	194
Carlyle Rubber Co., Inc.	194
Cincinnati Machinery & Supply Co.	194
Coal Mine Equipment Sales Co.	193, 196
Columbia Const. Co., Inc.	198
Crawflock Co., John D.	197
Darien Corp.	193, 199
Duquesne Electric Mfg. Co.	199
Economy Co., Inc.	195
Electric Equipment Co.	199
Electric Service Co., Inc.	198
Florence Machy. & Supply Co.	197
Foster Co., L. B.	194, 196, 198
Frank, M. K.	196
Gavenda Bros.	198
Glazer Steel Corp.	196, 198, 199
Greensburg Machine Co.	197
Guyan Machinery Co.	193, 196
Industrial Equipment Co.	196
Iron & Steel Products, Inc.	194
Jones Mining Equipment Co.	199
Kadco Corp.	199
Kirk & Co., Inc., Wallace E.	197
Locke Co., C. B.	198
Mansbach Metal Co.	194
Mid-Continent Coal & Coke	197
Midwest Steel Corp.	196
Moorhead Reitmeyer Co.	197
Morrison Railway Supply Corp.	196
Newberry Mfg. Co.	199
O'Neill, A. J.	194
Smith, H. Y.	199
Stanhope Inc., R. C.	199
Stanhope, L. M.	198
Tippins Machinery Co.	193
United Electric & Machine Co.	199
Villere Co., Walter P.	193
West Virginia Mine Supply Co., Inc.	193



PITTSBURGH TESTING LABORATORY
ESTABLISHED 1891
PITTSBURGH, PA.

TEST NO. PH-796
TEST NO. 11209.19
REPORT
July 14, 1945

Wire test of - Wire rope assemblies made of 6x19 PREFORMED Improved Plow
Steel Wire Rope with Independent Wire Rope Center with
ACCO-LOC SAFETY SPLICE Loop on each end.

Reported to - American Chain & Cable Co., Inc.
Wilkes-Barre, Pa.

TEST NO.	ROPE DIAMETER	ACTUAL BREAKING STRENGTH	MINIMUM REQUIRED BREAKING STRENGTH	TYPE OF FRACTURE
1	3/8"	14,600#	12,800#	4 strands & center
2	3/8"	14,680#	12,800#	6 strands & center
3	3/8"	11,600#	12,800#	5 strands & center
4	1/2"	26,010#	22,400#	4 strands & center
5	1/2"	25,850#	22,400#	4 strands & center
6	1/2"	26,030#	22,400#	4 strands & center
7	5/8"	51,250#	49,900#	3 strands & center
8	5/8"	50,000#	49,900#	4 strands & center
9	5/8"	51,700#	49,900#	3 strands & center
10	1"	91,000#	87,600#	4 strands & center
11	1"	94,550#	87,600#	3 strands & center
12	1"	95,050#	87,600#	3 strands & center

RESULTS:
1. All specimens exceeded the minimum required breaking strength.
2. After testing, all ACCO-LOC SPLICES were intact. None showed visible deformation.

NOTES:
1. All minimum breaking strengths from Federal Specification RR-R-571a, dated May 8, 1945. Reference Table XVI for 3/8" dia. wire ropes, plus 14% for IWRG. Reference Table XXVII for 1/2", 7/8" and 1" dia. wire ropes.
2. For tests 1 to 9 and 12 inclusive speed of testing machine 1-1/16" per minute.
3. For tests 10 and 11 speed of testing machine 7/16" per minute.

PITTSBURGH TESTING LABORATORY
R. B. LUNCH
Physical Test Section

3/8" to 1" TRU-LAY Preformed wire ropes, equipped with ACCO-LOC Safety Splices, pulled to destruction — without the slightest effect on the rope terminals. That test was made by the Pittsburgh Testing Laboratories. But it is in the thousands of plants where ACCO-LOC Safety Splices are daily proving their 100% efficiency that the test of true worth is appreciated. — Compact, neat, flexible, made without distortion of rope structure, the ACCO-LOC Safety Splice is a revolutionary advance for wire rope endings. Send today for fully detailed literature.

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Elmenton, Pa., Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

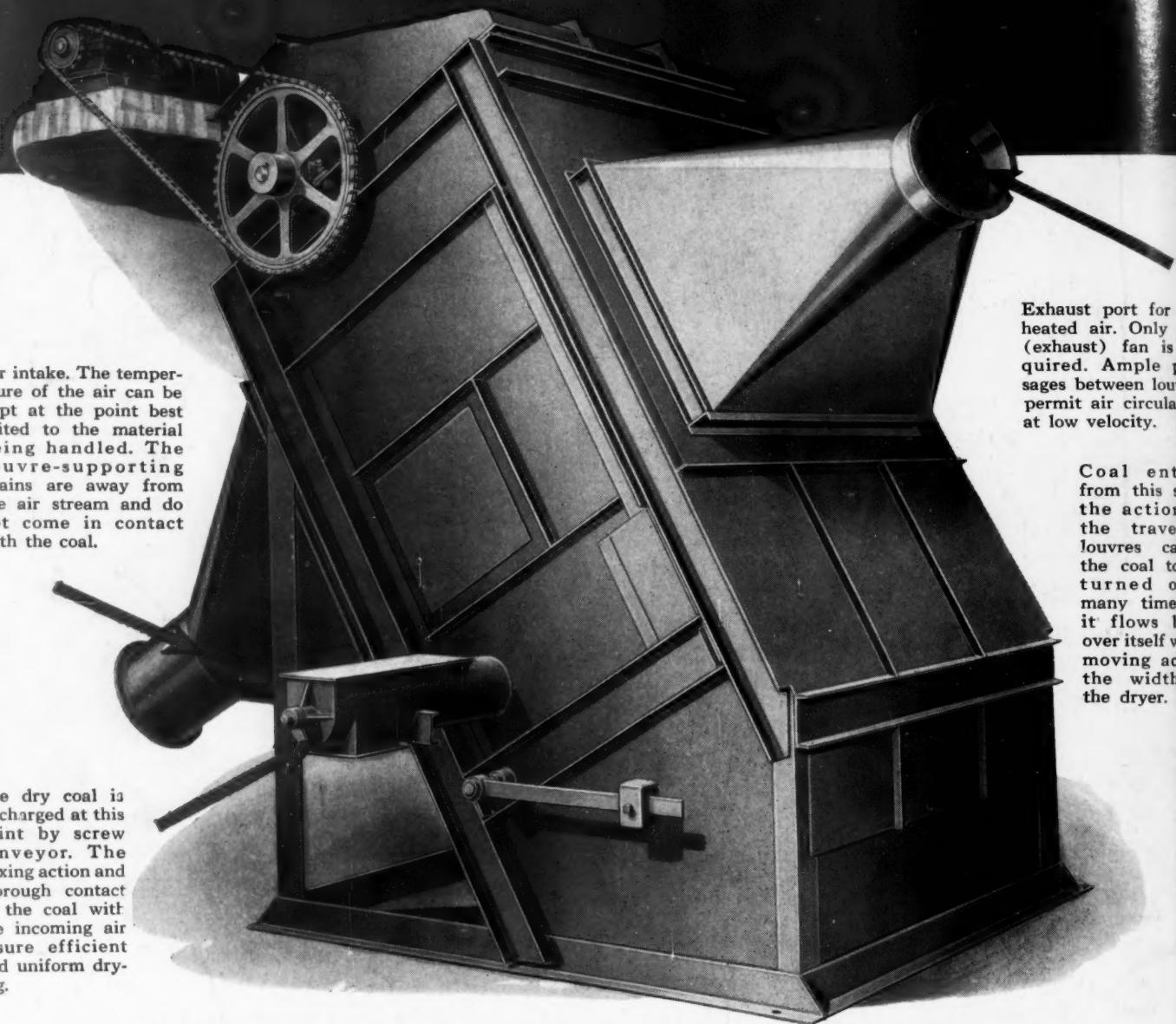


AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety



LINK-BELT *MULTI-LOUVRE* FOR COAL



Air intake. The temperature of the air can be kept at the point best suited to the material being handled. The louvre-supporting chains are away from the air stream and do not come in contact with the coal.

The dry coal is discharged at this point by screw conveyor. The mixing action and thorough contact of the coal with the incoming air insure efficient and uniform drying.

Exhaust port for the heated air. Only one (exhaust) fan is required. Ample passages between louvres permit air circulation at low velocity.

Coal enters from this side; the action of the traveling louvres causes the coal to be turned over many times as it flows back over itself while moving across the width of the dryer.

Faster Drying... Less Cost... Less Space

The problem of drying fine sizes of coal after wet cleaning is economically and efficiently solved by the new Link-Belt MULTI-LOUVRE unit, which permits faster drying without overheating, requires considerably less horsepower, needs less space, has simpler and less expensive fans, and lower installed cost. MULTI-LOUVRE drying is also justified where fines are air-cleaned at mines with prevalent moisture, by increasing the efficiency of air cleaning.

The MULTI-LOUVRE DRYER retains coal only a fraction of the time that is required by kiln type dryers. With this principle, rapid convection drying is obtained, which guards against damage to the coal that might be caused by overheating, such as oxidation or loss of volatile matter. Fully proved in service. Ask for Folder No. 2009.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va.,
Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4,
St. Louis 1, Seattle 4, Toronto 8.

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered,
Built and Backed by



LINK-BELT